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Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association Northern Minnesota Medical Association and Minneapolis Surgical Society

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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association Northern Minnesota Medical Association and Minneapolis Surgical Society

VOL. VIII MAY, 1925 No. 5

A CLINICAL DISCUSSION ON RAMISECTION*

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Mayo Clinic, Rochester, Minnesota

I feel rather incompetent to present the subject of Ramisection for Spastic Paralysis when Drs. Royle and Hunter, of Sydney, Australia, who devised this operation on the sympathetic nervous system, have so recently been in this country and have presented the subject so thoroughly from its experimental as well as from its clinical aspects. The presentation of their work has awakened in us great interest, and in consequence thereof we have operated upon a number of patients suffering from various types of paralysis, with varied results. We have been particularly impressed with the fact that it is possible, by means of ramisection, to reduce the spasticity in a selected group of these cases.

Boeke demonstrated that voluntary muscles are supplied by non-medullated fibers from the sympathetic nervous system in addition to the medullated fibers from the anterior horn cells. Considerable speculation and investigation have been directed to ascertaining the function of these sympathetic fibers. Langelaan, accepting De Boer's results, maintained that the sympathetic nerves were concerned with the maintenance of plastic tone, whereas the ordinary medullated nerves were concerned with the production of contractile tone. It was felt by De Boer, Langelaan and Kuno that the results obtained from section of the sympathetic fibers were due to the effects of vaso-dilatation in the limbs deprived of their sympathetic supply. A much more important criticism of De Boer's results arises from the experiments of Dusser de Barrenne, Van Rijnberk and Cobb, who found that section of the sympathetic nerve fails to influence the development and maintenance of decerebrate rigidity. This condition appears in animals after section of the brain in the mesencephalon and is generally admitted to be due to a great increase in the tone of the muscles sustaining the animal against the effect of gravity. If the sympathetic nerves have anything to do with tone or with hypertonicity, the effect of their removal should be noticeable in decerebrate rigidity.

Three sets of experiments were carried out by Dr. Royle, the first consisted of a sectioning of the cord, followed by a left lumbar sympathectomy; the second, a left lumbar sympathectomy without section of the cord; the third, a lumbar sympathectomy followed by decerebration. It was found that goats responded much more satisfactorily than did rabbits, cats, or dogs. The results obtained proved definitely that the sympathetic nerves play an important rôle in the maintenance of plastic tone.

In carrying out experimental studies in the development of this work, certain observations have been made: (1) Ramisection is of value in relieving spasticity of cerebral origin, unassociated with ataxia or tremor, and is indicated in patients who have good mentality, are able to stand or to sit up alone, and who are of sufficient age to co-operate in the postoperative treatment; (2) it is not indicated in cases of Parkinson's disease or paralysis agitans; neither is it indicated in the presence of muscular involvement of the pharynx or larynx. We have operated upon two patients suffering from paralysis agitans; in one we did a cervical ramisection, and in the other a lumbar ramisection. Our results, in both instances, were disappointing inasmuch as it was impossible to arrest the tremor or to check the progress of the disease. However, ramisection does diminish spasticity in the extremities of patients who have difficulty in walking or in using the arms and hands, and is indicated when such spasticity interferes with the normal movements of the extremities.

Case 1 (L. G.). A boy, 6.5 years of age, who gave a history of Little's disease with moderate involvement of all extremities and hands. While he was able to walk with some difficulty, he was unable to write or to feed himself.

*Presented before the meeting of the Minneapolis Surgical Society, Dec. 11, 1924.

The parents of this boy were teachers and had made every attempt by means of massage, passive motion, muscle training and exercise to improve his condition. The left arm and hand were less spastic than the right, and a great deal of attention had been paid to the treatment of this hand, but even at his age he was unable to make a straight line or to print or to write a legible letter or number. We felt justified in doing a right cervical ramisection, and removed the superior, middle, and inferior ganglia with all of the rami, explaining to the parents that a Horner's syndrome, or a contracted pupil with an endophthalmus, would result. On the fourth day postoperatively, the boy said to his mother, "Mamma, my hand is not tight any more," and on the sixth day postoperatively, of his own accord, placed a pencil in his right hand and made legible numbers and letters; the boy knew his alphabet and his numbers, but had been unable to write.

At a second operation, a similar procedure was applied to the left cervical ganglia and rami, when it was interesting to note that the same thing occurred on the left side as had occurred on the right, and the boy now transferred the pencil to the left hand, with which he had been trained to write, and found that he could write better with the left hand than with the right. Since operation, this boy has continued to improve and at the present time he can write as distinctly as any child of his age and can also feed himself with a spoon.

Similar results have been obtained in operations upon the lumbar sympathetics.

RESUME

While the work in this field is still in its experimental stage so far as the surgical indications and the surgical application are concerned, the results obtained are convincing that the operation is of definite value in diminishing spasticity or releasing plastic tone, and is indicated in a selected group of patients with fair mentality and muscular control. The operation will not restore function to a paralyzed extremity. Contractures and deformities must be corrected by orthopedic measures either before or after the operation, and in addition massage, passive motion, and exercises must be carried out. The statement may be advanced that inasmuch as orthopedic measures will relieve some of the spasticity, ramisection has no surgical indication. It is true, ramisection is not indicated in patients who can be relieved by orthopedic measures or by Stoffel's operation, but when these have been tried and found to fail, ramisection is a procedure which can be employed in the hope of accomplishing something for the spastic individual.

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DISCUSSION

DR. GEIST (Minneapolis): We are very grateful to Dr. Adson for having come to Minneapolis and given us such a clear exposition of "The Australian Operation" and his comments thereon. Dr. Adson's attitude is certainly the safe and sane one.

In discussing this operation we must not forget that in past years we have already employed many other types of operations in these cases of spastic paralysis and we have succeeded in improving the physical condition of many patients afflicted by this disease. I am sure Dr. Adson does not intend to give us the impression that the operation under discussion this evening is intended to supersede entirely those measures which I have in mind. Briefly the operations which we have been doing up to this time are as follows:

First, Tendon Lengthening (either subcutaneous or by the open method). It has been found that actual lengthening of a tendon in some way or another reduces to a greater or less extent the spasticity present in the affected muscle. Tenotomies in these cases cannot be entirely discarded.

Second, The Foerster Operation. This operation was devised somewhat over twenty years ago by Foerster of Breslau. It consists of dividing some of the sensory roots, chiefly in the lumbar region. It is a difficult operation and not devoid of considerable risk and results on the whole have not been gratifying; nevertheless, in certain cases it has proven of benefit.

Third, The Stoffel Operation. This consists of dividing a portion of the sensory section of certain peripheral nerves (chiefly in the lower extremities) and is an operation which at the present time is very popular among orthopedic surgeons. Bruce Gill, of Philadelphia, at the last meeting of the Orthopedic Association reported a large number of cases (something over 100) with, on the whole, excellent results. The Stoffel operation is a comparatively simple operation, not dangerous to life, and, in the opinion of orthopedic surgeons, a distinct advance in the treatment of this condition.

It may be said the benefit derived from all of these measures depends almost entirely on the mentality of the child. I am glad indeed that Dr. Adson brought this point out in connection with the new procedure he speaks of. Given the child with no mentality or poor mentality none of these operations can be expected to be followed by brilliant results. On the other hand, given a child with a good or brilliant mentality (and there are such afflicted with one or the other forms of spastic paralysis of childhood), then we may look with confidence for considerable improvement as a result of operative interference, be it by "The Australian Method" or be it by one of the methods just mentioned.

DR. R. E. FARR (Minneapolis): I wish to congratulate Dr. Adson on his presentation of this subject. I do not feel that there is any great danger of surgeons attempting to do unnecessary operations in this field. Many of these people cannot be improved and Dr. Royal has laid down very definite rules. I saw Dr. Royal examine a number of cases in Chicago and of these he only picked out one as suitable for operation. According to his reports he has had very good success where the operation was indicated. I saw him operate upon a child, doing a lumbar sympathectomy, and he made the exposure very quickly and with no difficulty. I believe the intraperitoneal route may become the most satisfactory in the case of adults. The mental cases that Dr. Jones mentions are not likely to be confused with those where Hunter and Royal have recommended operation. However, the mental condition of the patient will have a good deal to do with subsequent training of the muscles.

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TYPHOID VACCINE

The typhoid vaccine now in general use is usually made from a type of organism of low virulence, properly sterilized by heat and containing preservatives, and is administered in doses of three injections, seven days apart. Immunity apparently appears about the end of the first week after the first or second injection. The blood serum of the vaccinated person has then acquired immunizing properties. These properties increase and may reach their maximum shortly after the third injection. It seems to be agreed that this immunity, once acquired, may last for several years; but there is no absolute certainly that a person immunized may not be subsequently infected during this period and typhoid fever produced.—*(Jour. A. M. A., Mar. 21, 1925, p. 916.)*

VISUAL FIELD CHANGES IN NORMAL PREGNANCY*

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Minneapolis

Defects in the visual fields in normal pregnancy have been recognized for many years. The frequency of this limitation of the fields and the cause for the field changes have not been recognized until recently.

A review of the literature shows a number of references to visual field changes occurring during uncomplicated pregnancy. In 1903, Bellinzona and Tridonani[1] published the results of their studies in regard to modifications in the visual fields in pregnant subjects. Twenty-four patients were observed, but no case reports were given. They concluded: (a) that bilateral limitation of the visual fields occurs during pregnancy; (b) this limitation does not consist in a uniform and concentric restriction, but in a hemilateral restriction, namely in a slight beginning hemianopia and a heteronymous hemianopia; (c) this condition is more marked in primipara than in multipara and grows worse with advancing pregnancy; (d) the restriction of the visual field is concentric for the various colors; (e) visual acuity is usually preserved. The authors assume that since there is nervous asthenia in normal pregnancy, there is also optic asthenia, and since there is decreased excitation to reflex, so there is diminished extension of the visual fields; and they imply that the observations made resemble latent hysteria since normal visual acuity was preserved.

In 1910, Forti[2] verified the findings of Bellinzona and Tridonani by examining the visual fields in normal pregnancy and concluded: (a) that the restriction of the visual fields during pregnancy is less marked in both nasal fields and more marked in the two temporal fields; (b) there is no degree of difference between the restriction of the right and left visual fields; (c) restriction is greater in primipara than in multipara, but it cannot be said to grow worse in advancing pregnancy; (d) the restriction in the visual fields for color is nonconcentric because the color areas overlap and

*Thesis read at the Minnesota Academy of Medicine, November, 1924.

cross one another; (e) visual acuity and accommodation are normal. Forti gives no case reports or detailed optic findings; no data on number of patients examined, nor months of pregnancy.

Graef,[3] in 1922, writing on eye conditions in pregnancy, refers to a narrowing of the visual fields and attributes the field changes to emotional influences of pregnancy.

Finlay,[4] in 1922, examined the visual fields in thirty-one cases of normal pregnancy and found that in only nine cases could the visual fields be considered normal. He concluded that the normal hypertrophy of the pituitary gland in pregnancy induces compression of the chiasm manifesting itself by bitemporal contraction of the fields of vision. Changes in the color fields were mentioned only in one case, in which there was a reversal of the fields for blue and red.

Carvill,[5] in 1923, examined 100 pregnant subjects whose blood tests, urinalyses, ophthalmoscopic examinations and visual acuity were normal, and found that, of the 100 cases, twelve had normal fields, three weeks before parturition and the remaining eighty-eight cases showed varying degrees of bitemporal contraction of the visual fields. The fields for white were taken both before and after confinement and the postpartum fields showed a return to normal in a very large percentage of cases.

In 1924, Löhlein[6] studied the visual fields in normal pregnancy and found a bitemporal hemianopsia present in 80 per cent of his cases. He states that only exceptionally does contraction of the fields appear earlier than four weeks antepartum and that, as a rule, it disappears completely in a short time.

These changes in the visual fields, which have been noted by a number of observers, have recently been attributed to the anatomical relationship of the hypophysis cerebri to the optic chiasm, and to the pressure to which the optic chiasm is subjected by the enlargement of the hypophysis which occurs during pregnancy. That there is a normal hypertrophy of the pituitary gland during pregnancy has been demonstrated by a number of observers and especially by Erdheim and Stumme,[7] who published the results of their investigations in regard to the relative weight and size of the hypophysis cerebri in pregnant women, as compared with non-pregnant subjects, and found the average weight in primipara, a few days after normal parturition, to be .847 grams and the average weight in multipara to be .865 grams, as compared with an average of .618 grams in multipara of the same ages. They also give the average size and weight of the hypophysis in multipara in definite periods of pregnancy and show, in a similar manner, the process of retrogression of the hypertrophied hypophysis at stated periods following parturition. Their results, based on a study of 111 cases, show that the hypertrophy of the pituitary gland begins between the first and third months of pregnancy;

ERDHEIM AND STUMME 1909

Weight and dimensions of hypophysis during and after pregnancy.

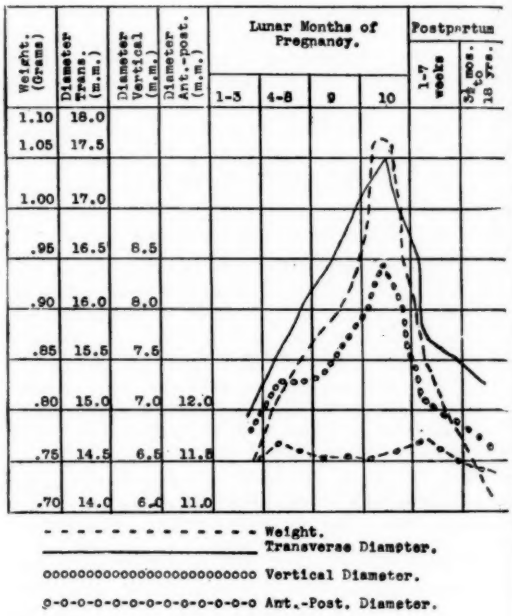
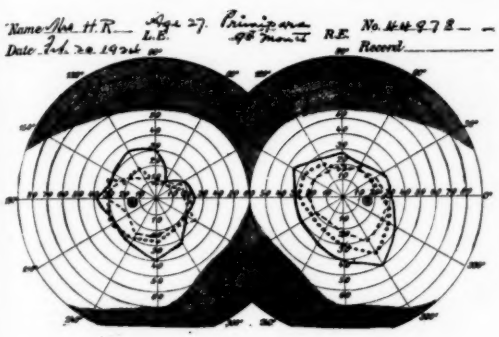


Figure 1

gradually increases in weight through the tenth lunar month, when it attains an average weight of 1.05 grams, and following parturition it decreases in weight rather rapidly during the first eight weeks. The authors also show the changes in dimensions of the gland in the transverse and vertical diameters during the same periods of time.

If, as seems probable, the changes in the visual fields during normal pregnancy are due to a tem-



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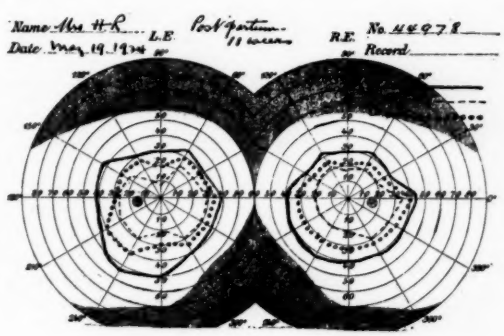


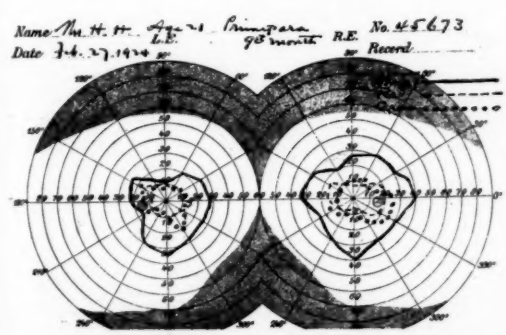
Figure 3

porary functional activity and hypertrophy of the pituitary gland, we may expect to find such changes as may be caused by pressure of the enlarged gland upon the crossed and uncrossed nerve fibers at the optic chiasm. There is a definite relation of the position of the nerve fibers in the chiasm to the different quadrants of the retinæ. The nerve fibers of the under surface of the chiasm are associated with the inferior portions of the retinæ; the fibers of the upper surface of the chiasm are associated with the superior retinæ; the outer or uncrossed fibers proceed from the temporal halves of the retinæ and the middle or crossed fibers proceed from the nasal sides of the retinæ.

It is to be expected then that, in addition to the bitemporal defects in the fields caused by pressure on the central portion of the chiasm with its crossed fibers, we will find numerous other field changes due to unequal pressure on portions of the chiasm by the hypertrophied anterior lobe of the hypophysis.

The material on which the present report is based was obtained from a study of the visual fields of twenty cases of normal pregnancy. In all cases, visual acuity was normal; ophthalmoscopic examinations were negative; physical examination, blood pressures, blood tests and urinalyses were negative; and there were neither subjective symptoms nor objective findings that indicated a toxemia. The visual fields for white and colors were carefully taken by my associate, Dr. W. H. Howard, in good daylight, using a standard perimeter with a radius of 33 cm. and a 5 mm. disk. The fields were charted at intervals of 15° and the central fields were re-examined with a Peters campimeter to determine the presence or absence of scotomata.

In every eye examined, there was a moderate or marked limitation of the field for white and colors; the character of the field changes varied greatly, but in all cases the greatest defect was on the temporal side. In a considerable proportion of cases there were marked sector defects for both white and colors and in some fields conspicuous altitudinal defects were present. In only one case



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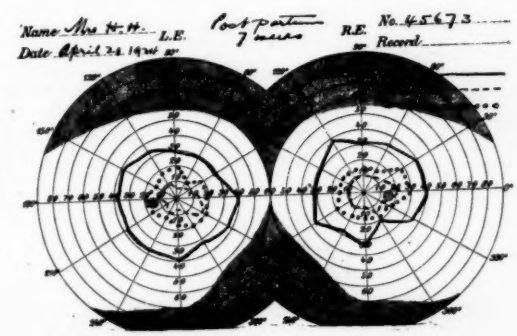

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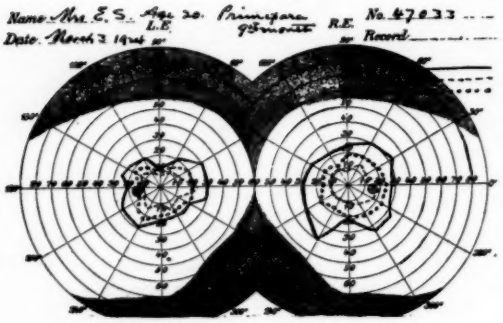

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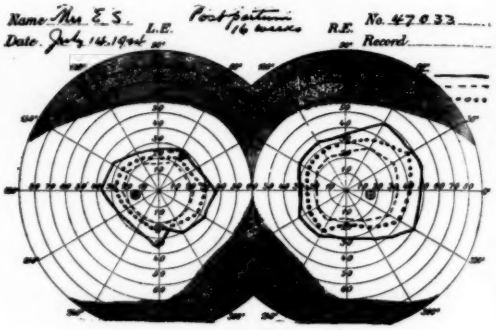

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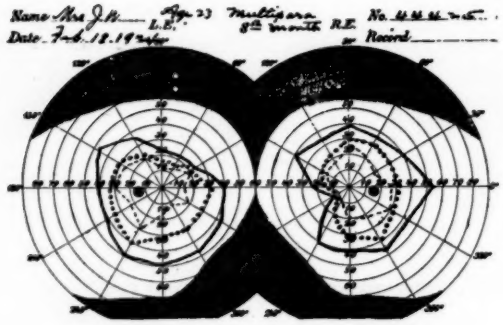

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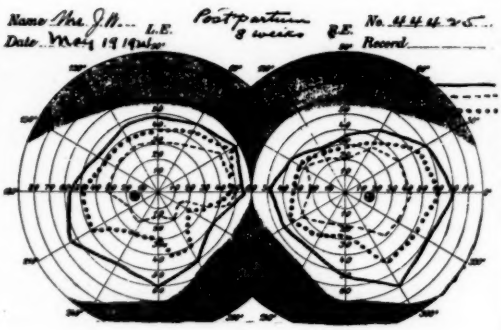

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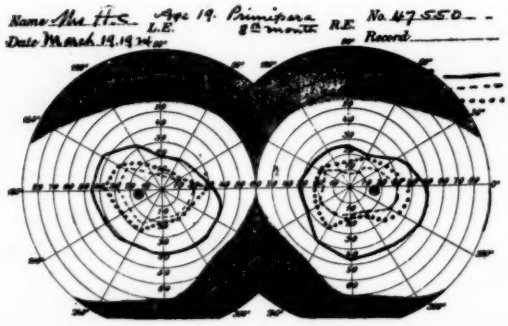

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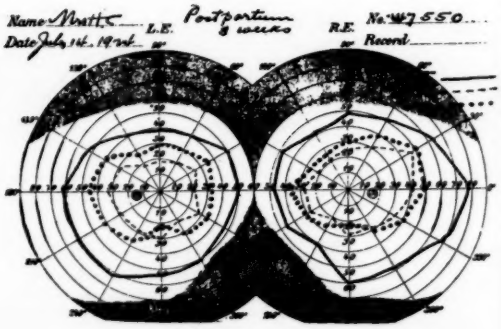

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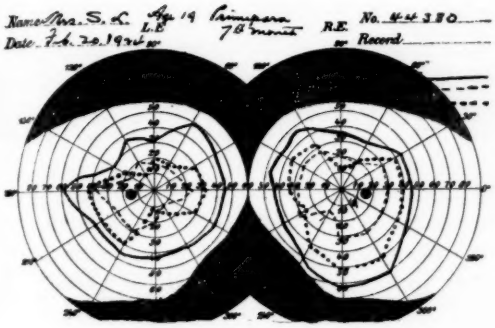

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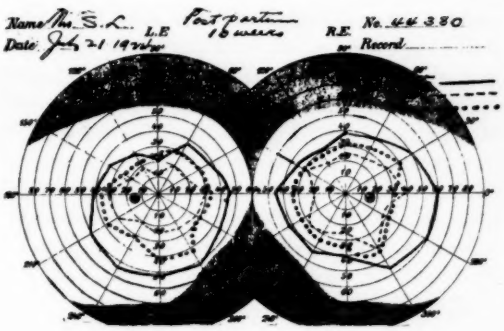

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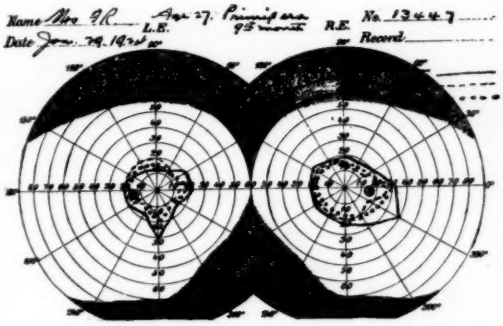

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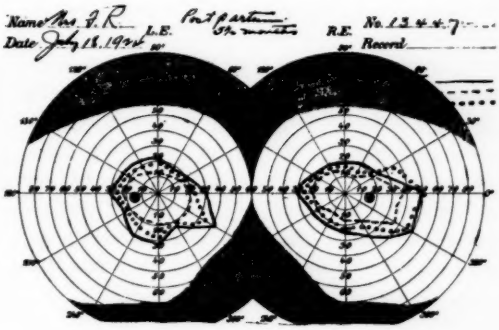

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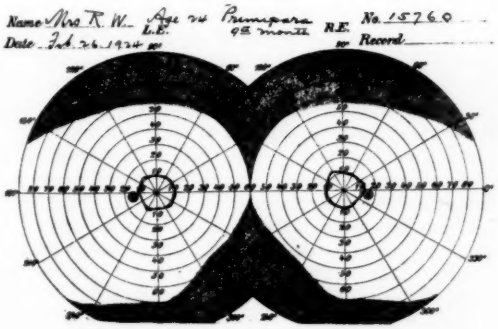

Figure 16

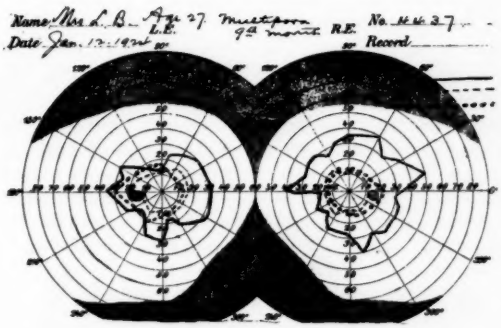

Figure 17

could a scotoma be demonstrated and in that case it took the form of an enlargement of the blind spot in one eye only. In three of the forty eyes examined, the field for white was contracted in all meridians to the ten degree circle. The color fields are particularly interesting in that they show frequent reversals or interlacing of the fields for red and green and two cases show the field for colors to be definitely outside of the white in a portion of the field.

TWENTY PATIENTS - AVERAGE VISUAL FIELD FOR WHITE AS COMPARED WITH NORMAL

	Normal	Average	Maximum	Minimum
Superior	45	23	40	10
Temporal	90	32	58	10
Inferior	70	29	60	8
Nasal	50	29	45	10

Figure 18

In eight of the cases examined, postpartum fields were taken from seven to twenty-two weeks following parturition. In none of these cases had the white and color fields returned entirely to normal and in a large proportion of the cases, the fields still showed considerable limitation. Insofar as our experience is concerned, it is uncertain as to the time, following parturition, that the visual fields become normal.

SUMMARY

1. Contraction of the visual fields occurs during the later months of normal pregnancy and is most marked on the temporal side.

2. The degree of contraction varies from a moderate or slight temporal contraction to one in which the entire periphery of the form field may lie within ten degrees of the point of fixation.

3. In some cases, marked sector defects occur in the periphery of the white and color fields.

4. The color fields show a reversal or interlacing in a very large proportion of cases.

5. Following parturition, the visual fields slowly return to normal and some cases show marked limitation of the fields as late as twenty-two weeks postpartum. Further observations are necessary to determine the average time at which the fields for white and colors regain their normal size.

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LOESER'S INTRAVENOUS SOLUTION OF CALCIUM CHLORID NOT ACCEPTED FOR N. N. R.

In the advertising of the New York Intravenous Laboratory, Loeser's Intravenous Solution of Calcium Chlorid is proposed for use especially in intestinal tuberculosis and tetany. In neither condition are the indications so urgent that the intravenous method is the only or the best method of introducing calcium. The oral administration is generally to be preferred. But the manufacturers make the astounding statement that "Neither calcium nor guaiacol is adapted to oral administration." The Council on Pharmacy and Chemistry found Loeser's Intravenous Solution of Calcium Chlorid inadmissible to New and Non-official Remedies because the advertising implies that the intravenous method is generally the method of choice for the administration of calcium and that calcium is not adapted to oral administration; these claims were held misleading and unwarranted.—*(Jour. A. M. A., March 21, 1925, p. 914.)*

POLLANTIN NOT ACCEPTED FOR N. N. R.

Pollantin Liquid, Pollantin Ointment and Pollantin Powder are hay-fever "remedies," manufactured in Germany and marketed in this country by Fritzsche Bros., Inc., New York. According to the advertising, it is prepared from the serum of horses inoculated with "the pollens of various species of ragweed and goldenrod, and of graminæ, such as rye, Indian corn, meadow foxtail, timothy grass, etc.," and is suitable for all forms of hay-fever. An enormous amount of work has been published controverting the claimed value of this serum. The principle on which Pollantin was founded has been found to be unsound, and there is no acceptable evidence to show that hay-fever is due to a toxin in pollen. The Council on Pharmacy and Chemistry found Pollantin Liquid, Pollantin Ointment and Pollantin Powder inadmissible to New and Non-official Remedies because the claims for their value are unfounded and they appear to be unscientific and useless articles. *(Journal A. M. A., Nov. 8, 1924, p. 1526.)*

THE HORMONE OF THE PARATHYROID GLAND—CHANGES IN THE BLOOD SERUM CALCIUM OF THYROPARATHYROIDECTOMIZED DOGS MODIFIED BY THE BOVINE HYDROCHLORIC X

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The results following the use of the Hydrochloric X of the bovine parathyroid, as already reported by the writer, demonstrated that it relieved artificial tetany in dogs. Suspecting that the tetany in dogs, following thyroparathyroidectomy, was due to a lowering of the blood calcium, as a lowering of the blood calcium is known to occur following the removal of the parathyroids in dogs, the writer decided to determine quantitative effect of the original Hydrochloric X on the blood calcium when injected. In order to assure himself that the dogs treated did not have aberrant parathyroids, specimens of blood were secured from the jugular vein before operation. The dogs reported in this article were starved for sixteen hours previous to operation.

Approximately eighteen hours following the operation another specimen of blood was drawn. It was found that a very noticeable drop in the blood serum calcium occurred following the removal of the parathyroids. Immediately following the securing of the second blood specimen for calcium determination, the original Hydrochloric X (5 c.c.) was injected intramuscularly. Six hours later another blood specimen was obtained, followed immediately by another intramuscular injection of the original Hydrochloric X (5 c.c.). Titration of this blood specimen revealed a rise in the blood serum calcium approximating that before operation.

In order to hasten the action and to determine whether, or not, a greater and more rapid rise in the blood serum calcium might occur with the use of a concentration, the original Hydrochloric X was treated with a sodium hydroxide solution until the maximum precipitation occurred, when the precipitate was removed by filtration and the filtrate concentrated by evaporation to one-tenth of the original volume of the Hydrochloric X.

The next morning, approximately sixteen hours after drawing the third blood sample for titration, another amount was secured and immediately followed by the modified Hydrochloric X (5 c.c.), equivalent to 50 c.c. of the original Hydrochloric X, as a subcutaneous injection. Titrations of this fourth series of blood specimens revealed a calcium content in the blood of three of the dogs above normal and the blood of the subnormal dog approaching normal. About seven hours following the subcutaneous injection of the modified Hydrochloric X, blood specimens were again secured and the calcium content of all four found to be well above normal, ranging from 14.3 mg. to 15.7 mg. per 100 c.c. Sixteen hours later, blood was again drawn and the calcium contents found to range from 15.7 mg. to 19.9 mg. per 100 c.c.

On the fourth day, two blood specimens were secured—seven and one-half hours apart. These were the seventh and eighth titrations. In the seventh series, the blood serum calcium was found to range from 13.8 mg. to 20.08 mg. per 100 c.c., Dog No. 3 having the highest calcium content.* In all of the dogs, except Dog No. 3, the calcium curve was on its downward course. The eighth titration revealed all bloods showing a decrease, the calcium content ranging from 11.3 mg. to 18.4 mg. per 100 c.c. of blood serum.

The reports of the dogs, with a table showing the calcium content of the blood specimens at each successive titration, follows:

Dog No. 1

(1st Day):

Short haired young adult yellow female cur (nulliparous), weight 14 kg., was fasted for 16 hours before operation.

1:55 p.m. Drew 10 c.c. blood from jugular.

1:57 p.m. Hypo. morph. sulph. gr. 1 and atropine gr. 1/100.

3:30 to 4:00 p.m. Complete thyroparathyroidectomy. Preserved glands in formaldehyde for serial sectioning.

(2nd Day):

10:10 a.m. 10 c.c. blood drawn.

10:12 a.m. 5 c.c. HCl X intramuscular.

*Note: No. 3—young dog.

The Hydrochloric X

Fresh bovine parathyroid glands (freed from fat as much as possible, without removing parts of the gland) finely divided.....30 grammes
Pure distilled water .....495 c.c.
Concentrated hydrochloric acid (C. P.)..... 5 c.c.

(The Hydrochloric X of the Bovine Parathyroid and Its Phosphotungstic Acid Precipitate.—Hanson—The Military Surgeon for January, 1924.)

This is boiled for two hours, removing much of the insoluble fats by skimming with a glass ladle. At the end of two hours it is allowed to cool, when more of the fat separates out and solidifies. It is then filtered through gauze and fine mesh filter paper. It is then made up to 500 c.c. with pure distilled water. 5 c.c. of the Hydrochloric X contains the active principle equivalent to 0.3 gramme of the fresh gland. The entire process is carried through in glass containers.

4:15 p. m. 10 c.c. blood drawn.
4:17 p. m. 5 c.c. HCl X intramuscular.
(3rd Day):
8:40 a. m. 10 c.c. blood drawn.
8:42 a. m. 5 c.c. s.c. of partly neutralized, fil. and conc. HCl X 10 equivalent to 50 c.c. HCl X. No symptoms of tetany.
3:30 p. m. 10 c.c. blood drawn.
(4th Day):
8:45 a. m. 10 c.c. blood drawn.
4:10 p. m. 10 c.c. blood drawn.
(5th Day):
8:30 a. m. 10 c.c. blood drawn.

Dog No. 2

(1st Day):
White and brown young pariparous adult female mongrel fox terrier, weight 10 kg., was fasted for 16 hours before operation.
2:00 p.m. 10 c.c. blood drawn.
2:02 p.m. Morph. sulph. gr. 1 and atropine sulph. gr. 1/100.
4:00 to 4:20 p. m. Complete thyroparathyroidectomy. Glands preserved in formaldehyde for serial sectioning.
(2nd Day):
10:25 a. m. 10 c.c. blood drawn.
10:27 a. m. 5 c.c. HCl X intramuscular.
4:19 p. m. 10 c.c. blood drawn.
4:21 p. m. 5 c.c. HCl X intramuscular.
(3rd Day):
8:45 a. m. 10 c.c. blood drawn.
8:47 a. m. 5 c.c. Modified HCl X s.c. No symptoms of tetany.
3:35 p. m. 10 c.c. blood drawn.
(4th Day):
8:55 a. m. 10 c.c. blood drawn.
4:12 p. m. 10 c.c. blood drawn.
(5th Day):
8:35 a.m. 10 c.c. blood drawn.

Dog No. 3

(1st Day):
White and brown nulliparous young adult female mongrel, weight 11 kg., was fasted for 16 hours before operation.
1:05 p. m. 10 c.c. blood drawn.
1:07 p. m. Morph. sulph. gr. 1 and atropine sulph. gr. 1/100 s.c.
2:10 to 2:30 p. m. Complete thyroparathyroidectomy. Glands preserved in formaldehyde for serial sectioning.
(2nd Day):
9:05 a. m. 10 c.c. blood drawn.
9:07 a. m. 5 c.c. HCl X intramuscular.
3:42 p. m. 10 c.c. blood drawn.
3:44 p. m. 5 c.c. HCl X intramuscular. No symptoms of tetany.
(3rd Day):
8:50 a. m. 10 c.c. blood drawn.
8:52 a. m. 5 c.c. Modified HCl X s.c.
4:16 p. m. 10 c.c. blood drawn.
(4th Day):
8:45 a. m. 10 c.c. blood drawn.
4:15 p. m. 10 c.c. blood drawn.

Dog No. 4

(1st Day):
White, black and brown nulliparous young adult female fox terrier, weight 9 kg., was fasted 16 hours before operation.
1:10 p. m. 10 c.c. blood drawn.
1:12 p. m. Morph. sulph. gr. 1 and atropine sulph. gr. 1/100 s.c.
2:40 to 3:00 p. m. Complete thyroparathyroidectomy. Glands preserved in formaldehyde for serial sectioning.
(2nd Day):
9:10 a. m. 10 c.c. blood drawn.
9:12 a. m. 5 c.c. HCl X intramuscular.
3:46 p. m. 10 c.c. blood drawn.
3:48 p. m. 5 c.c. HCl X intramuscular. No symptoms of tetany.
(3rd Day):
9:00 a. m. 10 c.c. blood drawn.
9:02 a. m. 5 c.c. Modified HCl X s.c.
4:18 p. m. 10 c.c. blood drawn.
(4th Day):
8:50 a. m. 10 c.c. blood drawn.
4:20 p. m. 10 c.c. blood drawn.

Blood Serum Calcium Milligrams per 100 c.c. at each successive titration.

Hours	0	18	24	40	48	64	72	88	112	136
Dog No. 1.	11.0	9.3	11.0	13.5	15.4	17.2	16.2	15.1	14.4	13.3
Dog No. 2.	12.3	8.6	10.0	11.2	14.3	15.7	13.8	11.3	9.0	8.7
Dog No. 3.	11.5	8.8	11.4	14.4	15.7	19.9	20.08	18.4	12.6	...
Dog No. 4.	11.9	8.6	11.2	13.5	15.6	17.0	15.2	10.2	9.2	...

These dogs, with the exception of the sixteen-hour period of starvation preceding the operation and the remainder of the day following the operation, were fed on the usual dog food of ground meat. No signs of tetany occurred and the dogs appeared normal until the calcium level reached was low.

The Kramer-Tisdale method was employed in making the calcium determinations. The potassium permanganate solution was prepared in accordance with the directions given by J. A. Halverson and O. Bergeim.* Two titrations were made on each sample of blood drawn, with the exception of the second titration series in Dog No. 4, because of the impossibility of securing sufficient serum for two titrations. All of the titrations checked within 0.02 c.c. N/100 potassium permanganate titrating solution. The correction

*Journal of Industrial and Engineering Chemistry, 1918, x, 119.

determined by the blank determination was 0.02.

In Dog No. 3, in which the calcium content reached the highest level, there was an increase of 74.6 per cent above normal and an increase above the level found following thyroparathyroidectomy of over 128 per cent. In Dog No. 2, in which the least rise in the calcium content was found, the highest increase above normal was 27.6 per cent, while the increase above the lower level reached following thyroparathyroidectomy was 82.5 per cent.

In this experiment a rise in blood calcium above the content normal for each dog, the percentage increase ranged from 27.6 to 74.6 per cent, while the percentage of increase above the lower level reached following thyroparathyroidectomy ranged from 82.5 to 128 per cent.

The writer calls attention to the fact that his Hydrochloric X is prepared from strictly fresh parathyroid glands of cattle, and, if these instructions are faithfully followed, and the X is concentrated as the Modified Hydrochloric X, described in this article, he feels confident that honest investigators may easily and definitely check his results.

CONCLUSION

An acid extract, as the Hydrochloric X, or the Modified Hydrochloric X, contains that parathyroid element which raises the calcium content of the blood as shown by this experiment. This is most conclusive in the mind of the writer, as this increase of blood serum calcium has been secured in thyroparathyroidectomized dogs on a meat diet. It also tends to show that tetany is probably due to a hypocalcemia.

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ACTIVE IMMUNITY IN SCARLET FEVER*

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The serious ravages of scarlet fever among children and the rather recent developments in active immunization against this disease have been topics of unusual interest within the past year.

Following the investigations of Dick,[1] Dochez,[2] Tunnicliff,[3] Gordon[4] and others, the results of which were, in short, that the cause of scarlet fever is the scarlatinal streptococcus and that this organism is a definite biologic type, a skin reaction to the toxin produced from the organism was announced by Drs. Dick in January, 1924. By injecting 0.1 to 0.2 c.c. of a diluted toxic filtrate intradermally in individuals who gave a negative history of scarlet fever they produced local reactions, whereas, in those previously infected by scarlet fever there were no reactions. Zingher[5] made a practical study of this test in a large group of individuals and by injecting larger and more concentrated doses of the toxin into a number of children who were susceptible found that approximately 61 per cent of them were immune as determined by a re-test at the end of two months. He used a series of three injections at weekly intervals of one hundred, then two hundred fifty and again two hundred and fifty "skin-test doses" for children under twelve years of age.

Through the courtesy of Dr. Zingher, who kindly furnished me with the toxin as prepared by the Dicks, I undertook a study of its value: (1) as an index of immunity or susceptibility to scarlet fever; (2) as an aid in diagnosis of doubtful cases; (3) as an agent in producing active immunity to the disease.

THE DICK TEST AS AN INDEX OF IMMUNITY

In attempting a study of this phase our first consideration was the reliability of the product to be used. It has been emphatically stated by those who have done pioneer work in this field that so far we have only a comparative method of standardizing the toxin. The toxin used by Zingher has been standardized by noting, in different dilutions,

*Presented before the Lymanhurst staff March 24, 1925.

its local effect on the forearm of a Dick-positive individual as compared with the effect of a toxin which is kept on hand. The variable strength of some preparations for the test I believe may lead to error, because one which is too strong will give positive reactions in some persons actually immune and conversely one which is too weak may give negative reactions in many who are susceptible.

In performing the tests with Zingher's toxin, a dilution of 1-1,500, as suggested by him, was used. A control test of the same preparation, which was first heated in a water bath for one hour, was applied on the opposite forearm. In each case 0.2 c.c. was injected, using the same technic as for the Shick test. In the interpretation of the reactions I used Zingher's scale, i.e.:

TABLE 1

Dick test	Control test
Test Toxin Diluted 1:1000 contains	Test Toxin (1:1000) Heated to 100 C. for one hour
(a) Toxin	Contains
(b) Various proteins	Various proteins

READING OF REACTIONS IN TWENTY-FOUR HOURS

Positive	++	+	or ±			—		
Positive-combined	++	or	+		±	or	+±	
Negative		—				—		
Negative-pseudo ...	+	1	2 or 3	+	1	2 or 3		

++Maximum reaction. Intense redness and local induration.

+Marked redness with slight or no local induration.

±Varying degrees of redness, from a moderate red to a pink. No induration.

+±Small area of faint redness. No induration. This reaction is classified with the negative reactions.

The results of 422 tests are included in this study and, grouped chronologically, show the percentage susceptibility for different ages (Table 2).

TABLE 2

A.	(Birth to one year)	30 %	Positive
B.	(One to two years)	62.5%	Positive
C.	(Two to three years)	72.7%	Positive
D.	(Three to four years)	66.6%	Positive
E.	(Four to five years)	50 %	Positive
F.	(Five to ten years)	40.9%	Positive
G.	(Ten to fifteen years)	34.5%	Positive
H.	(Fifteen to twenty years)	25 %	Positive
I.	(Over twenty years)	23.4%	Positive

The rather small percentage of positives in group A is probably accounted for by the fact that the majority in this group were new-born infants. The figures otherwise are slightly higher than some of those previously published although the curve of all the figures corresponds quite closely to what we expect as the incidence of susceptibility to scarlet fever at various ages.

Since the test is read at the end of twenty-four hours we have a comparatively rapid means of determining the possibility of cross-infection in a patient's immediate environment. In this study it was hoped that we might utilize the scarlet fever antitoxin for passive immunity in positive cases that had been exposed. Inability to secure a suitable preparation however precluded this possibility. Recent work reported in the literature indicates that we may soon have a preparation which will permit further progress in this direction.

A small number of "exposure" cases were followed after the Dick test had been applied and they are briefly summarized in Table 3.

TABLE 3

24 Exposed Individuals	Contracted Disease	Did Not Contract Disease
9 Dick Positive	2+(1?)	6
15 Dick Negative	0	15

The questionable case listed is that of a nurse who two months ago was Dick-positive. At that time she was caring for a scarlet fever case and immediately afterward had a rather badly infected finger and sore throat. She is now Dick-negative.

Aside from these definitely exposed cases none of the negatives have to date contracted the disease. Though the number of cases is rather limited the study thus far would suggest that the test is a reliable one as an index of immunity.

A rather interesting observation was made on five mothers and their newborn babies (Table 4).

TABLE 4

Mrs. M.—No history of scarlet fever	+	Baby	—
Mrs. J.—No history of scarlet fever	+	Baby	—
Mrs. L.—No history of scarlet fever	+	Baby	—
Mrs. G.—No history of scarlet fever	—	Baby	—
Mrs. T.—Scarlet fever at eight years	—	Baby	—

According to test there were antitoxic antibodies present in all the babies whereas in two of the mothers they were absent.

DIAGNOSTIC AID OF THE DICK TEST

In this study clinical cases of scarlet fever were selected. Tests were performed as soon after the onset as possible and thereafter at varying intervals. These are included in Table 5.

TABLE 5

Case	Days Ill	Test	Days Ill	Test	Days Ill	Test
I.	3	+	10	—		
II.	6	—				
III.	2	+	9	—		
IV.	1	+	5	+	17	—
V.	3	+	9	+	22	+
VI.	11	—	43	—		
VII.	2	+	7	—		
VIII.	4	+	11	—	18	—

In this group all the cases with the exception of Case I became negative between the fifth and seventh days. Case V had a rather faint but definitely punctate erythema, associated with a mild constitutional reaction and slight congestion of the pharynx. There was no desquamation.

Case VI illustrates the value of the test from a diagnostic point of view probably better than any of the others.

J. R., aged 8, white, male, four days previous to admission complained of sore throat, high fever, and severe epistaxis. Rather profuse hemorrhage from the nose during the next three days was checked by cautery but recurred shortly after. At this time the child also had a vaccination "take." One year previous to the present illness he had a secondary anemia resulting from hemorrhage from nasal varices. There was no history of scarlet fever.

When first seen, at the time of admission, unusually prominent papillæ of the tongue were noted. The child was extremely pale and there were typical purpuric areas over the trunk and extremities, with a Hgb. of 7% (Dare), Rbc. 810,000, and Wbc. 8,800. The differential was normal. Smear showed severe form of secondary anemia. The bleeding time was 4 minutes, and the coagulation time 2 minutes, with a rather non-retractile clot. Blood platelets 150,000. Transfusion and nasal cautery, calcium and opiates were used and the bleeding stopped. Six days after admission there was a generalized coarse desquamation of the skin and a Dick test at this time was negative. The boy was transfused six times and after a stay in the hospital of eight weeks was discharged. At the present time his hemoglobin is 57%, he feels and looks well and is still Dick negative.

Although no eruption was ever noted, the above case no doubt represents a true scarlet fever infection and I believe the Dick test has a definite place as an aid in diagnosis where there is any question whatsoever of scarlet.

ACTIVE IMMUNIZATION

To induce active immunity in susceptible individuals the same toxin was used as had previously been used for the Dick test except that it was more concentrated (Dilution 1-20). The dilutions (in saline) were so prepared that 0.2 c.c. (dose No. 1) represented 100 skin test doses, 0.5 c.c. (dose No. 2) represented 250 skin test doses, and 1 c.c. (dose No. 3) represented 500 skin test doses. Later, doses of 250, 500 and 1,000 were used.

Injections were given at intervals of seven days, beginning with .2 c.c., then .5 c.c. and finally 1 c.c.

In eighty-six cases inoculated all showed a local reaction, consisting of redness and swelling of the tissues. The area affected varied from 4 cm. in most cases to an involvement of the entire upper arm in a few. Constitutional symptoms were noted in 47 cases. These consisted of slight fever, general malaise, headache and nausea.

In four cases a faint rash, sore throat and moderate elevation of temperature were observed. In no case did the symptoms persist longer than thirty-six hours. Fifty-two of the cases have been retested and the results are tabulated below.

TABLE 6

Case No.	Interval between last injection and first re-test	Result	Second re-test	Result
1.	11 weeks	Positive		
2.	12 weeks	Negative		
3.	12 weeks	Negative		
4.	9 weeks	Negative		
5.	9 weeks	Positive sl.		
6.	13 weeks	Positive		
7.	12 weeks	Negative		
8.	16 weeks	+— — (Neg.)		
9.	9 weeks	Negative		
10.	14 weeks	Negative		
11.	12 weeks	Negative		
12.	12 weeks	Positive		
13.	6 weeks	Negative		
14.	6 weeks	.7x1.0 Ind. and raised Control 0.5x0.7. Not ind. or raised.		
15 to 48	7-8 weeks	Negative		
49.	7-8 weeks	Positive		
50.	7-8 weeks	Positive (?)	8 weeks	Neg.
51.	5 weeks	Negative	15 weeks	Post.
52.	7 weeks	Negative	17 weeks +—	Post.
53.	13 weeks	Negative		
54.	10 weeks	Positive		

Of the fifty-four cases retested to date forty-six, or 80.5 per cent, were immune according to test after intervals of from five to sixteen weeks. Two cases have apparently lost their immunity toward the end of fifteen and seventeen weeks respectively.

The high percentage of immune cases at such a comparatively short interval is unusual. Thirty of the cases, immunized by one individual, were all negative on re-test and this result brought up the question of whether the test material had possibly been improperly diluted. These cases are now being repeated.

In conclusion I would say, from the results of the work so far, that: (1) the Dick test seems to be a reliable indicator of immunity or susceptibility to scarlet fever; (2) it has a definite place as a diagnostic aid in questionable cases of scarlet fever; (3) the toxin seems to render individuals immune for a period of at least ten to fifteen weeks. How much longer the immunity lasts, cannot be said as yet. Two out of fifty-four cases lost it after fifteen and seventeen weeks respectively.

I believe that physicians should keep an open mind and try to avoid prejudice in this question of scarlet fever immunity until more cases have been observed over a reasonable period of time. Until more work has been done to prove or disprove the efficacy of our present or any improved forms of toxin, it is as unfair to condemn it as it is to pronounce it a panacea.

I am indebted to Drs. Huenekens, Moriarity, Stewart, Richdorf, Butzin and Arthur for their co-operation which made this study possible.

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DIATHERMY IN VASCULAR CIRCULATORY DISTURBANCES AND ARTHRITIS*

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St. Paul

Diathermy has a definite place in therapeutic medicine. It is our most valuable method of using heat. It is easily applied. It is constant and can be measured.

"Most important, it will heat distant parts; the quantity of heat varies as the resistance of the tissue through which the current passes, the greater the resistance the greater the heat."

Diathermy has a wide application. It is contraindicated in: (1) undrained pus areas; (2) when there is a danger of hemorrhage.

A great commercial enterprise has come into being. There are those who will almost persuade one to believe that diathermy is a new panacea. We have all heard startling statements; many are true, some are propaganda.

Our experience with diathermy, while recent and limited, has taught us several things. We have used it almost a year, and during this period we have given nine hundred treatments to approximately fifty patients. Most of these treatments have been given by one individual in an attempt to ascertain the true status of conversive heat, thus the conclusions in this paper are drawn from personal observation and treatment. We have come to realize that it is not sufficient to purchase a machine. Most important is the selection of cases—knowledge of the apparatus and its proper application. The same rule is applied here as in prescribing any drug. Time is an important factor; it is rarely a single application, but rather repeated applications that benefit. The number and duration of applications vary as to conditions encountered.

In this paper we are concerned especially with the use of diathermy in vascular circulatory disturbances and arthritis. In passing may we say that it is an important adjunct in the treatment of sprains, fractures, bursitis and other bone and joint conditions.

We have used diathermy in several different vascular circulatory disturbances.

*Presented before the annual meeting of the Minnesota State Medical Association, St. Cloud, Minn., October, 1924.

Arteriosclerosis.—A fair number of middle-aged individuals are seen who complain of painful feet and calves made definitely worse by activity. A few of these patients present the syndrome of intermittent claudication. Examination of the extremities is negative except for varying degrees of sclerosis and cyanosis. Roentgen-ray pictures in the majority of these cases show sclerosis of the posterior and anterior tibial vessels. Several cases briefly cited will illustrate:

Case I. Mr. E. B., aged 54, was first seen March 31, 1924. He complained of painful feet with feeling of pressure over calves, aggravated by activity.

His illness had extended over a period of several years. He had had a variety of treatments including a course at Hot Springs with no benefit. Since the last of January pain and tenderness were so severe that it was almost impossible for him to wear his shoes or get about. The patient reported, walking with great difficulty, supported by two canes and wearing large overshoes.

Mr. E. B. said he had always been in fair health except for periodic attacks of gout. He stated he was a very heavy smoker and hearty eater.

Physical examination was essentially negative except for moderate sclerosis of the vessels and some distention of the veins of the lower extremity. His feet were mildly pronated and he had a mild cyanosis and redness of the toes. The dorsalis pedis pulse was present in both feet. The roentgen-ray showed sclerosis of anterior and posterior tibial vessels.

The patient stated that he had been given hot baths, baking, electricity, and hot packs with very little benefit. He was given diathermy, combination cuff and water method, to both feet for forty-five minutes. This was followed by massage for ten minutes. After the first treatment the patient reported that he had less pain and walking was much easier. At the end of several weeks he was able to wear shoes, his walking was much improved, and the pain was decidedly less. After five weeks the patient was practically well except for slight tenderness over the left tarsus. In addition to the diathermy the inner edge of both shoes, heel and sole, were thickened one-eighth inch and felt arches were inserted in the shoes. Mr. E. B. was seen recently and stated that his feet felt good and that he was able to go about his daily routine in comfort.

Case II. Mr. A. M., aged 47, was first seen at our office April 20, 1920. At this time he complained of pain in his legs and feet, aggravated by activity; also of a painful back. His present illness began in 1918. He first noticed numbness and tingling in the left foot, more apparent in the afternoon. During 1919 the right foot became involved. Elastic stockings, he said, seemed to aggravate his trouble. Since the onset, his trouble has progressively become worse until at present it is hard to get about. He admitted a Neisserian infection in 1917. He has a chronic myocarditis and is under the care of an internist. The patient is a very heavy cigar smoker.

Mr. A. M.'s physical examination was negative except for mild sclerosis of the blood vessels, chronic myocarditis, pendulous abdomen, mild spondylitis, definite interference with the circulation of the lower extremities, cyanosis of both feet, and redness of toes. In April, 1920, alternate hot and cold baths to both feet, forced fluids, and rest were advised. He was given an abdominal and back support.

The patient reported again in June, 1920. This time his back was improved but his feet still troubled him.

In February, 1924, his spine was apparently well. His legs and feet felt worse and he could walk only a very short distance without pain. His physical examination at this time was much the same as in 1920, except that the redness of the toes was more pronounced. Brachial blood pressure at this time was 120/60. Pulsation could be felt over both anterior tibials. The movements of both feet were good, and the arches were apparently normal. Urine examination was negative. Roentgen-ray showed definite sclerosis of posterior and anterior tibial vessels.

In February, 1924, the patient was given diathermy to both feet. A combination cuff and water method was used. This was followed by ten minutes massage. The following day the patient reported that his feet felt the best they had in several years. He was given several more treatments, when he was unexpectedly called home. Upon leaving he said he was very enthusiastic about the transformation in his feet. After the first treatment he had been able to get about without discomfort. He was greatly surprised and satisfied with the results. After returning home he was given a few more treatments by his local physician. March 17, 1924, the patient wrote that he was getting along nicely. On August 29, 1924, he reported that he felt quite well.

Endarteritis Obliterans.—Case III. Mr. H. D., a Russian Jew, thirty-one years of age, was seen at the office December 7, 1921. He complained at this time of a very painful left foot, especially the great, first, and second toes. The patient stated that he was a recent immigrant, had served seven years in the Russian army, four years of this period in the World War. During the war he suffered from exposure to weather elements, and lack of food and clothing. His present illness began late in 1919. He first noticed tingling and numbness of the left foot, especially upon activity. This has progressively become worse until at present he cannot hold his foot down for any period of time. Several weeks ago he developed a small sore on the medial aspect of the great toe. He states that he cannot sleep at night because the pain is almost continuous and most intense. He has found some relief by elevating his foot when sitting or lying down. The patient was treated in Russia but received no benefit. He has always been in good health except for a Neisserian infection in 1911. He is a very heavy cigarette smoker.

His general physical examination was essentially negative except for evidence of suffering and loss of weight and changes in the left leg. The left leg below the knee is atrophied, foot is cyanotic and cold, first and second toes are deep red, the great toe is ischemic. The blood pressure in the right popliteal space is 120, left imperceptible; right dorsalis pedis pulse present, left not palpable.

Mr. H. D. was given hot packs, fluids were forced, and potassium iodid given for a period of several weeks. At

the end of this time his condition was the same so hospital care was advised. The patient was referred to the Wilder Charity and in January, 1922, he underwent several operations. The great toe nail was first removed and soon after a periarterial sympathectomy of the left femoral artery was done. In conjunction with this patient was given sodium citrate intravenously and various medications were tried. He remained in the hospital for a period of three months, during which time his suffering was quite intense. He was discharged slightly improved.

The patient was again seen in June, 1924. At this time he stated his condition was worse. He could sleep an hour or two at a time, but it was impossible to work or be on his feet longer than several hours. He was advised to try diathermy and was given conversive heat, combination cuff and water method, to the left leg and foot. After the first treatment patient reported that he felt better and that he had suffered less pain during the night. He was given daily treatments for a week, time of treatment one hour, tolerance increased to 400 milliamperes. After a week's treatment, the patient walked with decidedly less lameness. He said he was practically free from pain, could sleep all night, and could get about with considerable comfort. He felt the best he had since the onset of his illness. After three more treatments the patient failed to report. After several days he again reported and informed us that he was working all day and as he felt almost as well as ever he thought further treatment unnecessary. However, he had noticed more tingling the last day so he returned for more treatment. He was advised to take at least three months of conversive heat. After four more treatments, during which period patient worked nine hours daily, he felt that his trouble was over and told us that he would report again if he had further pain. At the end of the first six treatments the dorsalis pedis, posterior tibial, and popliteal pulsations during treatment were quite marked. The marked tenderness over the great toe disappeared and circulation of the foot approached normal. On his last visit blood pressure of the left dorsalis pedis showed oscillation at 120, pulse faintly heard at 100, diastolic 70. Mr. H. D. on last report was working daily and doing nicely. He felt an occasional twinge of pain.

Raynaud's Disease.—Case IV. Mr. M. J., aged 48, was first seen at our office January 3, 1921. His complaint at this time was a sore and painful leg as a result of a fracture of the os calcis. In October, 1923, the patient quite suddenly became aware of numbness, tingling and burning of both hands, especially the right, aggravated by exposure to cold. As winter came on his suffering became most intense and it was impossible to expose his hands to cold for any period of time. Examination of the hands at this time showed definite sclerosis of vessels and circulatory disturbance of both hands, especially the right. Hands were cyanotic, the right showed definite blanching and ischemia of the index, second and third fingers. Patient's feet were somewhat cyanotic but dorsalis pedis pulse was present although somewhat sclerotic. Patient was unimproved after several weeks of hot packs, therapeutic lamp and galvanic current. He was then given diathermy, combination cuff and water method, to both hands. After several treatments the patient reported improvement and was then able to carry on routine work. During the winter of 1923-1924 he was given fourteen diathermy treatments, as a result of which circulation improved, blanching disappeared and patient suffered very little discomfort. In July, 1924, the patient reported that his fingers were apparently normal and he suffered no discomfort. He was asked to report if he should have further trouble.

In our group of circulatory cases we have had two patients who felt that after several treatments improvement was not great enough to warrant continuation; both, however, said they were slightly benefited.

Arthritis.—An extensive survey of conversive heat in arthritis is impossible at this time. To facilitate discussion let us divide the arthritides into two general groups, traumatic arthritis and infectious arthritis.

Traumatic Arthritis.—Our results in this group on the whole have been quite satisfactory.

Traumatic Synovitis.—Case V. Mr. E. B., a pugilist, aged 20, reported May 24, 1924, complaining of a sore and painful second knuckle of the right hand. He sustained an injury to the hand in a fight on April 5, 1924. He participated in several fights after the injury, which increased the pain and swelling, and on several occasions had novocaine injected before he fought, which seemed to aggravate the trouble. The patient was compelled to cancel three fights. He rested a month, during which time he was given hot and cold applications, massage, splinting and electricity, with only slight improvement. Examination of the hand showed swelling and tenderness over the head of the second metacarpal, with fairly marked crepitation, slight fluctuation present, and extreme motions causing pain. A diagnosis was made of traumatic synovitis of the second metacarpal phalangeal joint. During the first week the patient was given five diathermy and massage treatments. At the end of this course of treatments the tenderness, crepitation and fluctuation was diminished. On May 31, a week after his first visit, the patient fought. He reported on June 2d that he had won his fight, favoring his hand some. He was given three more treatments and then fought again, using his hand normally, and had no pain. He was given three more treatments, when he left for an eastern engagement. Upon his return he reported that his hand was as good as ever.

We have had several other traumatic cases that responded to diathermy after other therapeutic measures had been ineffective. Diathermy followed by manipulation and massage is of real value in the treatment of fibrous ankylosis, subsequent to trauma or infection.

Infectious Arthritis.—In eighteen of the twenty cases treated, conversive heat has relieved the soreness, stiffness and pain, but in no case has its use resulted in cure. All of these cases have been of long standing; many therapeutic measures had

been tried with indifferent results. All of these patients preferred this type of heat to hot packs or therapeutic lamp. Infectious arthritis of one or two similar joints is easily treated by direct diathermy; the extensive polyarthritides are a bigger problem. We have tried sedative therapy in several of these cases, but the time is too long and often the patient is exhausted before the treatment is completed. Recently we have confined our efforts to the painful joint, and cases in which all joints are actively involved are not given conversive heat. We have had several cases of gonorrheal arthritis which have been benefited by diathermy. In chronic infectious arthritis I feel that diathermy is a palliative measure. It will in most cases temporarily relieve soreness, stiffness and pain, and facilitate the absorption of adhesion and increase motion. It is of primal importance to seek the focus of infection and to use all possible means to rid the patient of the infecting organism. It should be used in conjunction with other therapeutic measures. Treatment as a rule is over a considerable period of time.

CONCLUSIONS

Our experience, while very limited, suggests the following:

1. Painful feet and calves in the presence of sclerotic vessels are benefited and probably cured by diathermy.

2. Conversive heat should be used in endarteritis obliterans before extensive surgical procedure is attempted or defeat acknowledged.

3. Diathermy has a definite place in the treatment of traumatic arthritis. It diminishes the period of disability and aids the prognosis.

4. Conversive heat is a palliative measure in the treatment of infectious arthritis. It is an important adjunct in dealing with this condition.

5. Like all therapeutic measures in medicine, results in diathermy are commensurate to its application. It must be observed with the same respect that is given any drug, and prescribed in the same careful manner. Indifferently or wrongly applied it can do no good.

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DISCUSSION

DR. P. J. BOMAN, Duluth: Diathermy or conversive heat unquestionably is a therapeutic measure which warrants our consideration. Medical therapy in the past, and at the present time, has suffered a great deal by two groups of men in the medical profession. In the first place, we have the old conservatives who refuse to accept anything except that which has definitely been established by long years of usage and of known benefit. On the other hand, we have a group of men who enthusiastically take up every form of treatment that is advocated and without any knowledge of the underlying principles or the indications for its use, apply it to any and all conditions. The result is that soon the therapeutic measure is thrown into the discard. There are always some men, though, who look at it from a conservative standpoint—the measures are studied; the underlying principles are known, and from a series of carefully controlled cases results are observed. It is only by this form of study of therapeutic measures that we are going to make progress in the field of therapy.

This is especially true of diathermy and it is not surprising that many of the older men, without experience with the later forms of electrical therapy, should be skeptical. Many have spent a good deal of money in useless apparatus only to find that it did not produce the results that had been promised.

On the other hand, we receive reports daily, and especially so within the last year, which indicate the value of diathermy. At the last meeting of the American Medical Association the interest in diathermy was very evident, as was shown by the papers presented there. The results reported showed that where diathermy was used in the conditions where it is indicated these men have had uniformly good results, as high as 70 to 80 per cent at times.

When Dr. Tuohy returned from Europe two years ago he was convinced that diathermy was a therapeutic measure we could not afford to be without. Since that time in the Duluth Clinic we have used diathermy as an adjunct to other therapeutic measures. We have never used it except in cases where we have had the patient under very careful control. All our work has been done at the hospital. We have used it in all types of cases where we felt that it was indicated, and I can say that our experience, while not, perhaps, showing as marked improvement in cases of the vascular type, as shown by the essayist, has been very satisfactory, and we feel that, in conjunction with other forms of therapy, it is of great value.

It is especially valuable in the traumatic arthritis and acute pains, neuritis, etc. In these conditions we have found it to be of distinct benefit. You will find that there is no form of drug which will produce the relief from pain which you will get by means of diathermy.

In most of those cases where you have severe injuries, with pain, you will not need opiates or analgesics if diathermy is employed.

I think the future will see the application of diathermy in a much wider field than at the present time. I feel that it will become established as one of the therapeutic measures which is of distinct value. If you will realize that diathermy is nothing which is occult or unknown, that it is heat produced within the tissues, and indicated where ever heat is indicated, you will have no misconception with regard to its use.

Dr. G. S. Wattam, Warren: Gentlemen, for a quarter of a century physiotherapy has been called to our attention by most reliable workers in this country, and yet it did not receive recognition until some of our men went over to Germany and found that it had recognition there and was being put to practical use. In speaking as a student of physiotherapy I can make no claim to other than a very superficial knowledge of the subject which Dr. Flagstad has so ably presented today. Diathermy is but one of the many therapeutic measures designated as physiotherapy. Under this heading we have the *x*-ray. We have also the ultra-violet ray and the alpine light. We have high frequency and we have galvanism. One of our most able students and one who had practiced physiotherapy for many years in Minnesota, said to me the other day, if he had to make his selection as to which of these he would use his choice would be between diathermy and galvanism.

I have little to add, at this time, to what Dr. Flagstad has said, excepting that his paper will be of very much value and benefit to our profession. As he has well said, diathermy is not a cure-all, but it is not without merit, and if given intelligent use and intelligent study, I believe that it will soon be recognized and given an important place in our medical curriculum where it deserves to have a place. Only by giving it recognition and weeding out the good from the bad can its use by charlatans and quacks be avoided. It is up to our medical profession to develop it and accept it, not turn it over to some outsider.

Dr. A. U. Desjardins, Rochester: Mr. Chairman, I should like to say that during the past twenty-five or thirty years electrotherapy in general has been very much discredited in America, owing largely to the fact that the different modalities of this therapeutic agency were misappropriated and misused by quacks of all sorts and disciples of all the various cults. The result has been that the regular profession has looked askance at all these methods of treatment. During the same period the situation in Europe was quite different. There electrotherapy remained in the hands of highly trained experts, most of whom were at the same time radiologists. The result of this was that the valuable features of electrotherapy were constantly being made use of for the benefit of such patients as required this type of treatment. When the war broke out many American physicians accompanied the American army to France and during their service there had the opportunity to see and to appreciate the value of sound electrotherapy, including, of course, diathermy, and it is since the war that diathermy and electrotherapy in general have again been gradually taken up by the profession. It is to be hoped that those who go into this work will so thoroughly prepare themselves for it that they will be able to carry it on intelligently and not merely take it up for base commercial reasons. Manufacturers of electrical apparatus are carrying on a far too vigorous propaganda which is unduly and improperly influencing many physicians.

As Dr. Boman has said, diathermy is simply a superior method of delivering heat to the tissues of the body. It is not a supernatural exhalation from Heaven and cannot be expected to accomplish miracles, but whenever heat is indicated, diathermy provides the means of delivering that heat when and where it is needed. It may be given in any intensity; it may be diffused or concentrated as much as may be desirable. The indications for diathermy are restricted to a somewhat limited group of pathologic conditions. It is especially useful in sprained joints; the inflammatory phenomena accompanying fractures; acute simple arthritis; in fact, many forms of acute inflammation in which suppuration is not present; sciatic neuritis; brachial neuritis; acute myositis; gonorrheal epididymitis and orchitis; dysmenorrhea, et cetera. The claim has been made that it is decidedly useful in pneumonia, but this has not been adequately confirmed. Certainly it is symptomatically useful, but it is doubtful if it can have any other effect on the disease than symptomatic relief.

In the more chronic conditions such as that large group of chronic arthritides, many of which are so difficult to treat, diathermy sometimes will yield striking results, but in the majority of cases the most that can be expected is a variable degree of relief from pain and reduction of swelling when present. It is folly to expect diathermy to remove bony changes around joints. In many cases belonging to this group, diathermy, in order to produce the best results, should be accompanied by intelligent massage or, in certain cases, orthopedic measures may have to be considered. One thing I am certain of and that is that diathermy will cause the profession in general to re-learn what nearly all physicians knew forty or fifty years ago about the indications for the application of heat.

Dr. J. C. Boehm, St. Cloud: I wish to compliment the author of this excellent and instructive paper and congradulate the members of this section for the opportunity given us. I want to add one or two more remarks. I have treated the enlarged prostate with diathermy. If you study the surgery of the prostatic enlargement and follow up the cases it certainly is not very encouraging for the older men. I have treated twenty-five cases with the Neiswanger method, using his latest electrode, the galvanic current and normal salt solution. The electrode is a soft rubber rectal tube 15 inches long of 32 F caliber. The distal end is perforated with small holes for about 2.75 inches. Inside of this is a spiral wire of galvanized iron. The proximal end of this spiral wire is attached to a metal-fitting for the rubber tube of an ordinary fountain syringe and to this is soldered a receptacle for the conducting cord, and over this perforated end of the rectal tube a gold beater's skin condom is firmly placed and tied so as to include all of the perforations within this bag. This is introduced into the rectum till the perforated end is approximately in contact with the prostate gland. Normal salt solution of 125 to 130 degrees F is used by means of a fountain syringe. The patient is placed in Sim's position, the salt solution is now allowed to enter the gold beater's bag through the

perforations until moderately distended, then shut off. This is now connected with the positive pole. The negative pole is connected with a suitable wet pad placed on the abdomen, or better still on the back over the twelfth dorsal vertebra and spine. Turn on the galvanic current very slowly until 35 to 40 m.m. is reached. Continue this for 20 minutes three times a week until the prostate is practically normal in size. Usually about twenty-four to thirty-six treatments are necessary. The electrode must be thoroughly lubricated with soap-suds or other material that will not interfere with the conduction of the galvanic current.

I have used diathermy in a small way since 1902 in cases where the ankylosed ossicles of the ear were responsible for the partial deafness which in some cases was considerable, and restored practically normal hearing using both diathermy and high frequency as the modalities.

Since then, better machines and better outfits have been manufactured, and we know more and more as time goes on. The World War has taught us to recognize these modalities in the reconstruction process of crippled soldiers. Since then I have treated five cases of enlarged prostate, using diathermy and sinusoidal currents with a special prostatic electrode in the rectum so that the convex surface of the metal electrode comes in contact and covers the prostate. A well soaped mesh pad is placed on the abdomen or, better, over the twelfth dorsal vertebra and rapid sinusoidal is used for about ten minutes.

Diathermy is much more promising, more convenient and much more rapid. I myself have taken two treatments a week apart. Before this I had to get up four to five times during the night and now I go to bed the usual time, half past ten or eleven and sleep till six in the morning and I do not have to get up once during that time to void urine.

Using either of the methods, diathermy or the Neiswanger method, the man goes about his business the usual way, and when cured he is still a man with the delicate sympathetic nervous system intact and he retains his mental faculties as though nothing had happened.

In addition to the use of diathermy in traumatic cases I have them to place or wrap over the part a warm pad to retain the heat as long as possible. This, however, is not necessary when the patient is in the hospital and in bed. Be sure and have everything ready before you turn on the current; then slowly, step by step increase the current until the desired effect is reached; usually from 300 to 500 m.m. I take five minutes to reach the desired point, give a twenty minutes treatment and take three minutes to get back to zero. Right here is where the most common mistake is made. It makes a big difference whether it is done right or wrong. For this kind of cases, never turn the current on rapidly or suddenly. Take your time, be sure the electrode or electrodes and pads are thoroughly soaped with soap-suds or lubricated with material that is a good conductor of electricity.

With the average individual using diathermy today, all the knowledge he has about it is what the man who installed the outfit taught him. That is why there are so many failures in the use of both electricity or diathermy; in fact in the whole range of physiotherapy.

THE PROGRESS OF CARDIOLOGY DURING 1924: A REVIEW OF THE WORKS OF CLINICIANS AND INVESTIGATORS IN THE UNITED STATES

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(Concluded from page 236, April issue)

XIII. PHYSIOLOGY

Eyster and Middleton found that the venous pressure in the peripheral veins of normal man resting in the prone position rarely exceeds 11 c.c. of water. Higher readings, when local obstruction was excluded, invariably indicated cardiac decompensation. Marked changes in venous pressure under such conditions are apparently accompanied by corresponding changes in the volume of the heart, as determined by the roentgen ray. Changes in the peripheral vascular system, associated with alterations in the capillary pressure and flow, alter the venous pressure in the larger veins but little, if any. Venous pressure is a measure of the initial load on the right heart, and depends primarily on, and is an indication of, cardiac behavior.

The experiments of Andrus and Carter on the perfused hearts of terrapin and dogs permitted them to conclude that the excitatory process in the heart, as in other irritable tissues, represents a disturbance of ionic equilibrium between the cell contents and tissue fluids. They conclude that conduction is due to the direct stimulation of adjacent tissue by the disturbance so developed at the point originally excited.

Adolph and Fulton studied the effect of high temperatures on the circulation in man. They found that exposure to high temperatures increases the loss of carbon dioxide from the blood through the skin and lungs. This lowering of the carbon dioxide tension increases the hydrogen-ion concentration of the blood and ultimately leads to an excretion of alkali from the blood. The carbon dioxide dissociation curve of the blood is not significantly altered. The peripheral blood vessels are greatly dilated during exposure to high temperatures, and this dilatation continues indefinitely. The lack of a high resistance in the peripheral blood vessels prevents blood from returning to the

heart. The heart rate increases steadily and rapidly, and is even able to increase the systolic blood pressure. In spite of this compensatory action on the part of the heart, the blood flow back to the heart finally becomes inadequate. At this stage circulatory failure or shock is complete, with faintness. The rise in skin temperature seems to play the initiatory part in the control of the respiratory and circulatory reactions.

Johnstone demonstrated complete heart-block in chick embryos during the second, third, and fourth days of incubation. Heart-block was produced by applying ligatures around the heart at a time when, so far as known, it possesses neither nerves nor auriculoventricular bundle, but consists only of a continuous sheet of muscle cells, the myoepicardial mantle, surrounding an endothelial tube, the primitive endocardium. It seems probable that conduction through the myoepicardial mantle is from cell to cell. It has furthermore been shown that the normal conduction of the contractile impulse in the mantle is from sinus to auricle, auricle to ventricle, and ventricle to bulbus arteriosus. Heart-block was also produced by crushing or placing a ligature around the primitive heart at any level.

Tulgan, working with cats, was able to show that the increase in heart rate above that of the completely denervated heart cannot be considered as being due to inhibition, but must be due to some accelerator influence. An increase in heart rate may occur independently of the cardio-inhibitory center. Provided the heart is not beating at its physiologically maximal rate, a definite increase in the rate may be obtained by stimulation of an afferent nerve after the vagi have been divided.

XIV. ELECTROCARDIOGRAPHY

Year by year a greater interest has been manifested in electrocardiography and greater clinical application of this important branch of cardiology has been made. It has proved a wonderful asset in permitting an accurate identification of alterations in the cardiac mechanism, the findings obtained materially increasing the accuracy of prognosis and the records aiding the intelligent direction of treatment.

Dock and Levine, in an analysis of 614 cases of auricular fibrillation, found that in about 2 per cent of the cases a regular ventricular rhythm occurred with a heart rate more than fifty-five each minute, and was present as a transient phenomenon during the administration of digitalis.

In discussing transient and recurrent auricular fibrillation, Patterson says that he believes that transient auricular fibrillation may occur in normal hearts, that the condition is more common than is generally supposed, and may occur in various toxic conditions, reflex and nervous conditions, intoxications, and after surgical operations. A single attack does not necessarily indicate myocarditis, but recurrent attacks do indicate heart disease, and tend to become more frequent, severe, and finally permanent.

Barker's study indicated to him that extrasystoles occurring in hospital patients was an unfavorable prognostic sign. Extrasystoles of auricular origin are more serious than those of ventricular origin and the difference is sufficient to justify the attempt to distinguish between the two.

An interesting case of auricular flutter is reported by Wilson, in which vagal stimulation was followed by a definite increase in the rate of the circus movement. He explains this by the fact that the increase in auricular rate was attributed to a shortening of the path of the circus wave effected by a reduction in the length of the refractory period of the auricular muscle.

Reid reported a case in which ventricular tachycardia was followed by ventricular fibrillation. In discussing the nature of the mechanism he suggests that both disorders are due to the excitation wave traveling in a circular path through the ventricular muscle. This is said to be the first example on record in which electrocardiograms taken from a human subject have shown the sequence of ventricular ectopic tachycardia to fibrillation of the ventricles.

Porter cites a case of paroxysmal ventricular tachycardia, lasting one hundred and fifty-three hours, with recovery of the patient. The patient had previously had a coronary thrombosis.

Barker described a very rare occurrence, having had the opportunity of observing a case exhibiting a short run of irregular ventricular tachycardia during a paroxysm of auricular tachycardia.

A case of unusual interest was presented by Fenn in which the cardiac mechanism varied greatly from day to day as follows: (1) complete auriculo-ventricular dissociation, all ventricular complexes except one, the result of auricular activity; (2) auricular flutter; (3) a transition from 3:2 block to complete dissociation with a period of 2:1 block between, and (4) auricular fibrillation. The

latter mechanism persisted until the patient's death. At times the ventricular rate was very slow, during which some of the ventricular complexes were of the supraventricular type, while others resulted from different areas in the ventricle itself.

Gager studied a patient with a large pericardial effusion accompanied by complete heart-block which promptly disappeared after paracentesis.

Barker and Kinsella observed a dog suffering from experimental streptococcus endocarditis that shortly before death developed sino-auricular block. At necropsy an inflammatory process was found on the wall of the right auricle surrounding the sino-auricular node. The node itself was normal. Although an anatomic basis for sino-auricular block was found in this case, the authors issue the warning that in most cases probably there is no anatomic basis.

Feil and Katz, in a study of twenty-four patients with hypertension, determined the dynamic changes in ventricular systole. Simultaneous subclavian arterial tracings, heart sound graphs, and electrocardiograms were recorded. The measurement of the electrical systole was compared with the duration of the total systole, as derived by a modification of the formula of Lombard and Cope. In patients without signs of cardiac failure the total systole was found to be increased in one-third of the cases by 0.02 to 0.10 second. In the other two-thirds, little or no variation occurred. In patients with signs of cardiac failure the duration of the total systole was shortened in half the cases by 0.01 to 0.08 second, while in the others there was little variation from the normal. The shortening of the systole in these cases is believed to be due to an altered response of the muscle to overloading.

In an analysis of the electrocardiograms in cases of mitral stenosis, pulmonic stenosis and aortic regurgitation, White and Burwell found a definite relationship between abnormal right axis deviation and mitral and pulmonic stenosis, and between abnormal left axis deviation and aortic regurgitation. They also found that the auricular complex of the electrocardiogram in Derivation I, Derivation II, or both, is almost always abnormally prominent in cases of mitral and pulmonic stenosis.

The electrocardiographic studies of Cohn and Swift in cases of rheumatic fever have been an important contribution to this branch of cardiology. They found evidence of myocardial involvement in 95 per cent of the cases, chiefly reflected in the ventricular components of the electrocardiogram.

Thacher analyzed the electrocardiograms of eight cretins and twelve Mongolian idiots, taken before the institution of treatment. In pure cretinism, as in myxedema, the T wave is lowered, flattened or even inverted and can be brought to normal by the administration of thyroid. No characteristic electrocardiographic changes were noted in Mongolian idiocy.

In a study on the changes in the mechanism of the human heart preceding and at death, Willius records his observations in six cases. In every instance auricular activity ceased before the ventricular; the shortest duration was fourteen and eight-tenths seconds; the longest, eight and one-half minutes. The slowest recorded sequential auricular rate was 22, while the slowest ventricular rate was 14. Two patients at the beginning of the graphic studies had auricular fibrillation, but this disorder did not occur as an intercurrent event. Nodal rhythm occurred in five cases; there were two instances of the reversed rhythm type, two of simultaneous contraction of auricles and ventricles, and one of diminished P-R interval associated with the P-R-o type. Three instances of complete block were noted, while sino-auricular block occurred twice, and delayed auriculoventricular conduction and partial heart-block once. One patient exhibited a period of auricular flutter with varying degrees of heart-block. Two patients had periods of pacemaker migration. There were two cases of bundle branch block. In three cases long periods of complete cessation of cardiac activity occurred, 9.4 seconds, 9.4 seconds, and 11.4 seconds, respectively. Ventricular fibrillation occurred in four cases and was the terminal mechanism in three. Fusion of the R and the T waves was noted in three cases.

A similar study of seven cases conducted by Kahn and Goldstein revealed that all or some of the last electrical complexes occurred after clinical death in each case. In each case, the first and main effect was failure of the sinus control of the heart, with assumption of the control of the auriculo-ventricular node. The cessation of the normal auricular contraction stimulus seems to be the critical phenomenon in the process of death. Before this happens, the sinus node shows irritability and depression in various sequences and degrees, and it is probable that if the disturbance could be controlled before the cessation of function, recovery of the heart might occur. Although ventricular

extrasystoles are common in the heart of the dying animal under experimental conditions, only two cases in human beings were encountered. Ventricular fibrillation occurred in two cases, in one instance momentary and in the other more prolonged. In both, this was followed by a very short period of recovery of rhythmic ventricular action, but without any regularity. The ventricles stopped beating before the auricles in three cases. In the other three, auricular action ceased first.

XV. METABOLISM AND VITAL CAPACITY

In studying the changes in the basal pulse rate and pulse pressure accompanying variations in the basal metabolic rate, Read found that the pulse rate varied directly with the basal metabolic rate, and that the co-efficient of correlation between the two was 0.74. The pulse pressure was also found to vary directly with the basal metabolic rate, the co-efficient of correlation being 0.62. In view of the fact that individuals vary in the amount of change in either pulse rate or pulse pressure, a more reliable measure of the circulatory system's response to variations in oxygen consumption is a combination of pulse rate and pulse pressure, as suggested below. Pulse rate and pulse pressure changes may be utilized as a rough guide to changes in the basal metabolic rate, especially if the relationship is once established by obtaining all basal figures simultaneously. The following formula is suggested which Read believes will give the basal metabolic rate within 10 per cent of its correct value in about half of the cases. B.M.R.=0.75 (P.R.+0.74 P.P.)—72.

A case of ventricular tachycardia was studied by Dieuaide, who found a definite decrease in the oxygen saturation and in the carbon dioxide content of the arterial blood. The basal metabolism in one paroxysm was elevated to 16.7 per cent. The respiratory gases and basal metabolism were normal during the time of normal cardiac mechanism.

Joannides determined the effect of dyspnea produced by exercise, by increased carbon dioxide tension in the inspired air, and by lack of oxygen, on the vital capacity of the lungs. He found a decrease in the vital capacity when the pulmonary ventilation was increased. In a few experiments exercise produced a slight but definite increase in the vital capacity. After exercise a condition is produced quite similar to that in patients suffering from heart disease with reference to their vital capacity, in that there was a tendency toward dyspnea and a diminution in the rebreathing interval. The increase in the vital capacity is secondary to the dyspnea, and depends primarily on conditions which produce dyspnea.

The vital capacity of college students based on a height standard was studied by Hewlett, who found it to be considerably higher than that of patients with cardiac complaints and without objective evidence of thoracic disease. In the series of patients with cardiac complaints, serious lesions were more common among men than among women. The symptoms most constantly associated with low vital capacity were cough and dyspnea. The seriousness of the various tabulated manifestations of heart disease, as judged by vital capacity averages, was, in decreasing order, extrasystoles, hypertension, left ventricular preponderance, enlarged heart, T-wave negativity in Derivation I, auricular fibrillation, and widened QRS group. Excluding aortic regurgitation and aneurysm, positive Wassermann reactions were not associated with any reduction of the vital capacity.

Gordon, Levine and Wilmaers made observations on a group of marathon runners with special reference to the circulation. They found that the average vital capacity of the lungs was normal. A fall of 17 per cent in the vital capacity occurred immediately after a race, which, however, returned to normal in twenty-four hours. The hearts of the marathon runners, as determined by the *x*-ray, were not enlarged, but immediately after a race there appeared to be a temporary decrease in size, which gradually returned to normal in about one day. The systolic blood pressure immediately after a race was normal, while the diastolic pressure was distinctly diminished.

XVI. X-RAY EXAMINATION OF THE HEART

Burnett contends that the physical methods of examination in the demonstration of aortitis, dilatation and aneurysm of the aorta have all proved undependable, while aortic thickening (increased density) and the pulsations of dilatation and aneurysm are demonstrated fluoroscopically with great ease. All factors influenced by motion, as presented in all the various positions of the heart, or of any of its chambers or appendages, are exhibited in a manner which furnished a mental picture far more valuable than an instantaneous record of one fraction of the cycle. At times an antero-

posterior exposure discloses a very slight or no deviation from the normal, but an oblique view discloses an increased density, enlargement, or pulsation not noted otherwise.

In an *x*-ray study of 350 cases of heart disease in children, Perkins found such examination of material aid in confirming physical signs. It presents an accurate method of differentiating normal from abnormal hearts in children at different ages. Progress of the disease may be determined by successive examinations. As a method permitting differentiation of congenital heart disease and disease of the thymus, it is invaluable. It offers important aid in distinguishing cardiac enlargement from pericarditis with effusion.

Tables are presented by Hodges and Eyster for the estimation of the normal cardiac area in man. They are derived from the formula: area in square centimeters=age 0.0204+stature 0.8668+weight 0.337—the constant 63.8049. If the heart is found to be 7 sq. cm. larger than the predicted area, the chances are 3:1 that it is actually enlarged. With 14 sq. cm. the chances of enlargement are 10:1; and with 21 sq. cm., 45:1.

XVII. MISCELLANEOUS

In a discussion of the relationship of the vegetative nervous system and the heart, Babcock emphasizes the importance of deciding the nature and cause of simple tachycardia or attacks of ventricular extrasystoles. The relation of these disorders of cardiac action to points of irritation in the abdomen or pelvis should be determined, which excite the action of the sympathetic or parasympathetic (vagal) portion of the nervous system. Coexisting valvular or myocardial disease may not be responsible for the disorders of heart action. In treating these cases it is important to eliminate the cause of the irritation rather than to treat the heart directly.

Dana concludes that more valuable information regarding the status of the circulation than that given by a jugular venous record, is often obtained by an auricular tracing, especially in cases of heart disease and peumonia, and in the determination of cardiac efficiency in doubtful cases. The examination of auricular pressure curves in relation to periods of forced respiration may be of value.

Five cases of symptomatic polycythemia with cyanosis and dyspnea are reported by Morse. Four of the cases presented clinical features closely resembling Ayerza's syndrome, but due to pulmonary fibrosis rather than to primary disease of the pulmonary artery. The fifth case showed that extensive pulmonary syphilis may occur without Ayerza's syndrome.

THE SANBORN TREATMENT FOR DIABETES

This was formerly exploited to the public by the Analytical Laboratories, Inc., Chicago, which had for its president C. S. Harmon and for its medical director Ida M. Sanborn. Mr. Harmon died Dec. 14, 1924, the cause of death: diabetes mellitus. According to the advertising the treatment involved no interruption of ordinary pursuits, and a normal, nourishing diet, with no restrictions, was fundamental and essential from the start. It was announced that each case was individually diagnosed and treated under the personal direction of the medical director, Dr. Sanborn.

The treatment has been boosted by one Edwin F. Bowers, who has been connected with nostrum exploitation. According to Bowers "The Treatment Dr. Sanborn employs consists of a combination of Leptandrin, Sodium Sulph., Potassium Phos., Sodium Cacodylate, Sod. Bicarb. and Capsicum, so adjusted and proportioned as to meet the wide range of pathological conditions that present, or the changes that may develop during the progress of the treatment."

About a year ago the Chicago office was closed and the next heard of the treatment was from "The Sanborn Laboratories," Battle Creek, Mich., and large newspaper advertisements sing its praises. It has for its "medical staff" Walter T. Bobo, M.D., and Ernest D. Perkins, M.D.—names that will sound familiar to students of contemporary quackery.—*(Jour. A. M. A., Mar. 7, 1925, p. 768.)*

SCARLET FEVER ANTITOXIN AND SCARLET FEVER SERUMS

The scarlet fever serum of Dochez and Blake is prepared by injecting a horse with culture medium and into this inoculating living streptococci which cause abscesses producing toxin against which the horse develops antibodies. The serum derived from the horse is an antistreptococcus serum.

The scarlet fever antitoxin prepared by the Dicks is secured by injecting a horse with a toxin prepared from the filtrate of cultures of specific streptococci isolated from cases of scarlet fever. With this toxin, the Dicks report, they have been able to produce symptoms in human beings that closely resemble the symptoms of scarlet fever. The toxin therefore is injected into a horse. The serum obtained from the horse is a scarlet fever antitoxin just as diphtheria antitoxin serum is prepared by inoculating a horse with the toxin of diphtheria bacilli elaborated by the diphtheria bacillus. The latter statement is true, of course, only to the extent that the Dick toxin is actually the specific scarlet fever toxin. The matter is complicated still further by the fact that the Dick antitoxin is concentrated, and it is claimed less likely to produce serum reactions than the unconcentrated Dochez serum.—*(Jour. A. M. A., Mar. 14, 1925, p. 819.)*

ETIOLOGICAL FACTORS AND DIAGNOSTIC POINTS IN SOME ABDOMINAL TROUBLES*

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In this short paper no detailed differential diagnosis of abdominal troubles is to be attempted, but rather a statement of some observations which have helped in diagnosing abdominal conditions and determining their treatment. Dr. Billings is credited with the statement that a good doctor should be able to diagnose 95 per cent of his patients' ailments without complicated laboratory equipment. We do not minimize laboratory methods, but the man who deserts positive history and physical findings to negative laboratory findings will miss many important cases. A good history plus one's own examination is of first importance. One is surprised at the number of cases that have been passed around as neurotics with histories which should have laid the foundation for a working hypothesis or would have been conclusive in light of the subsequent history.

A case in point is a patient, 66 years old, a contractor, who had seen many men and institutions in three states. When nineteen years old he was in bed two months with inflammation of the bowels and had never been right since. Always his stomach! stomach! stomach! and nerves. Couldn't read the newspapers, couldn't concentrate on anything, hadn't attended to business for six years. A neurotic.

Examination.—Acidity practically normal. Cap normal. Outline and activity of stomach normal. Hard to be sure of any local abdominal tenderness because of general tension and extreme nervousness.

Findings.—An obliterated appendix, postcecal in a bed of adhesions. A gall-bladder with walls so degenerated that when moderate traction was made the whole end tore off. Appendix removed and cholecystotomy done.

Course.—A slow recovery but for two years has taken an active part in business. For the last three months has been having recurrence of trouble which I think is referable to his gall-bladder again.

Between the patients who remember and magnify all their troubles and the ones who minimize everything or grudgingly admit them, are the patients who seem actually to have forgotten that once, twice, many times five, ten, twenty years ago they had attacks at intervals which are typical of gallstone or some other outstanding trouble. The so-called "silent gallstone" has spoken many times in his younger active days and its persistent though less obtrusive influence can often be better diagnosed from a well developed history. The history of past or present focal infection is of great importance in considering abdominal conditions. Some men say they are tired of the term "focal infection"—call it any other name you want. A rose by any other name is just as sweet. However, if you want to practice successful medicine and surgery don't overlook possible distributing points of germs and their toxins. We know that beside the actual germ distribution with its many known results we have the action of the toxins on the central nervous system and because this has many times a noisy way of manifesting itself, the sympathetic nervous system, which it evidently likewise affects, is not so often considered. Impaired thyroid, adrenal, pancreatic, stomach and intestinal function can be brought about through the adverse influence from focal infection sources just as readily as the known motor and sensory disturbances are brought about from this same source. From an abdominal operating standpoint we are dealing with organs which are largely under the jurisdiction of the sympathetic nervous system and the importance of a smoothly working mechanism is not to be under-estimated.

For safer, quicker convalescence from operations have all active focal infection removed before operating if you have a choice in the matter. Many times the patients don't come back because they are cured or think they are, which may be the same thing. They haven't had any trouble since those teeth were removed, that septum straightened, or that antrum drained; the ulcer stayed cured, the gallbladder hasn't given any trouble and they "*never felt better.*"

The diagnosis of appendicitis is not always easy. Likewise the appendix is not always easily removed, otherwise one would hardly be justified in bringing this subject up again. In an obscure case that sounds like an appendix but doesn't localize right, don't fail to make a rectal examination whether it is a man, woman, or child, and a vaginal besides if it is a woman. A big percentage of these cases of pelvic appendicitis are drainage cases because they are not recognized soon enough. Two cases of this type came to me within the last year with some after results which were interesting and instructive. Both were men and came from distance.

*Presented before the annual meeting of the Minnesota State Medical Association, St. Cloud, October, 1924.

The first had a walled off pelvic abscess which had an amputated gangrenous appendix and a large enterolith. I let him go home in three weeks. He came back in a month with a very tender mass in the appendix region which only required an incision to evacuate a lot of pus. He went home in two weeks with the wound healed. He wrote me several times during the next three months saying he had attacks that reminded him of his old trouble and shortly after that came down again with a hard fist-sized tender mass under the last scar. Under the abdominal wall was a mass of omentum and more pus. I drained again. Next time he went to Rochester. He still felt kindly to me and came back and told me all about it. He said that all the men who examined him except Dr. Will Mayo thought it was malignant and he said that his age and his history would warrant it still being appendicitis and he got an appendix an inch long to prove it and the man is well.

The second man I did not do the primary operation upon but the history I got from the doctor was a duplicate of my case except as regards the enterolith. After the original operation there had been two where abscesses were drained and he was still having trouble. An *x*-ray disclosed a shadow of a stone which after further examination we were sure was not in the ureter or bowel. In a dense bed of adhesions we recovered an enterolith as large as a bean and were much pleased with ourselves. The patient made a nice operative recovery. About a month later the man's wife called on long distance saying he was having more trouble and was coming down. I was thankful for one more chance and how he escaped getting to Rochester I do not know but I got an appendix an inch long, and he has been well ever since.

The lesson to be learned from this is that following an operation where nature and not you did the amputating she is apt to leave the organ as long as possible so it can function again. Do it yourself and know it is done if symptoms recur. You can have frequent bowel movements in acute appendicitis without laxatives having been given. My observation has been that most of these cases have post-cecal, post-peritoneal appendices. They have the added disadvantage of less rigidity and tenderness and seem less urgent from the operative standpoint, but it is not so. A case that seems abdominal in its urgent symptoms and giving a leucocytosis of 20,000 or over in the first twenty-four hours should be very carefully studied. Pneumonia with actual peritoneal irritation will do this thing. There has been one finding which has been of service to me in substantiating the diagnosis of recurrent cholecystitis: it is quite persistent and can frequently be brought out in the history. The usual history would be this: The patient complains of a full, uncomfortable feeling in the pit of the stomach. He cannot eat or is more uncomfortable if he does. He may be nauseated or may vomit and have some tenderness over the gallbladder. He may have a slight fever and slight leucocytosis, which may last a few days or a week. Generally during a vomiting spell the gallbladder empties, the irritating, infected bile acts like a physic, giving a number of loose movements, after which the patient usually makes a rapid recovery.

There is evident need of a standard physical appraisement of the pathology of the gallbladder. Seeing a gallbladder, its surrounding liver changes, the duodenum and stomach, are a great advantage but many times we have to depend upon the sense of touch. My rule for making a longer incision for inspection is:

1. A tense gallbladder, one which does not empty under reasonable pressure.
2. Adhesions to the gallbladder.
3. Stones in the gallbladder.
4. A thick walled bladder.

All these points are quite readily determined if you can get a finger on the gallbladder. The blue color of the gallbladder is not so important to me as it used to be; at least I have discriminated my type of blue. The tense gallbladder regardless of its personal appearance otherwise is potentially a diseased one and my disappointments in good results have been from leaving it in rather than from taking it out. A pre-operative measure which may be used in suspected cases of this type is to reduce the weight and among other waist manipulating exercises is one where the closed right fist is placed at the edge of the ribs over the gallbladder region, the left hand is placed flat against the fist and both pressed against the right thigh by forceful prolonged pressure from the trunk. This pressure will be readily measured by the patient, for a gallbladder that does not readily empty is painful. The patient who will persist in practising this will get relief or an operation.

There is one etiological factor of gallbladder disease which should be emphasized and that is the mechanical obstruction from fat deposit around the cystic duct producing diminished calibre and increased angulation. The individual does not have to be obese to develop this. Fair, fat, forty and gallbladder disease are a commonly known quartet. It is at this time that the low grade infection that had been draining begins to dam back and give positive symptoms due to this source of obstruction. It is conceivable that many cases were not infected until this bile stasis and im-

paired circulation rendered the organ more susceptible. The source of infection may be through the portal circulation as per Graham and others, but my best judgment makes me give equal importance to other focal points. Why the appendix which is credited with getting its infection largely by the hematogenous route should preclude the gallbladder getting its that way is not clear. Under certain conditions they both drain their contents very poorly. The appendix has more lymphoid tissue than the gallbladder and carries normally infections in its lumen. These histological and resident properties of the appendix render it more susceptible to disease than the gallbladder, but in proportion as it has lymphoid tissue and poor drainage the gallbladder is just as prone to disease as the appendix and I cannot see why there should be any argument over its not sharing a like source of hematogenous infection. The gallbladder can be the source of active prolonged infection. A recent illustrative case in our hospital was that of an attache who had had typhoid nine years before. He was relieved of a stone which gave pure cultures of typhoid bacillus. This case might have explained the occasional case of typhoid fever which developed without known cause.

The following case reports are submitted:

H. B., a male student, aged 22, had always possessed good habits.

At five he had scarlet fever. In the following year when he had jaundice, he suffered from many attacks of diarrhea. Never robust, he always had to be careful of his diet. His bowels were inclined to be overactive. He had not been especially subject to colds or throat troubles.

In March, 1920, he developed a multiple arthritis associated with a diarrhea. In May he became helpless and was in bed for a year with rheumatism and diarrhea. He gradually improved so he could get up and around with crutches, but had been sometimes better and sometimes worse ever since. All his teeth and tonsils had been removed in Rochester in 1921.

The patient came to the office in August, 1923, on crutches, stating that for the past six weeks he had been especially bad. He was having eight to ten bowel movements daily and he complained of soreness of the abdomen.

The patient was anemic and weighed only 103 pounds. He had a rheumatic spine with arthritic hooks as shown by the *x*-ray. He was unable to walk erect. Movement of all the larger joints was painful, without special swelling, but the joints were prominent because of atrophy of muscles. The thyroid was small; heart and lungs negative. The abdomen was tense with tenderness and rigidity over the gallbladder region. Rectal examination was negative. The laboratory reported the urine: sp. gr. 1018, albumin one plus, a few pus cells being present. Blood pressure: 118/60; pulse 104; hemoglobin 70%; red blood cells 3,500,000; white blood cells 8,500.

He was given vitamine compound, Lily, and put upon acidophilous milk and such other food as he found he could take. He was afraid to eat anything. He gained on this treatment and there was improvement of the bowel movements but he kept having relapses.

In January this year he was still tender over the gallbladder, so he was sent to the hospital and operated. The gallbladder was of average size, thick walled, moderately distended, greyish-white in color, the mucosa showing small yellowish deposits. The liver showed moderate local scarring. Microscopical findings of both gallbladder and appendix were those of chronic cholecystitis and appendicitis.

Today he weighs 124 pounds, has formed bowel movements, eats everything except raw fruit, uses a cane instead of crutches, and all that troubles him is the deformities resulting from his old arthritis. It is too much to say that the gallbladder or the appendix were the primary causes of his arthritis. We did not see how diseased his tonsils or teeth were, but the bowel condition which may have been a factor in the arthritis was very probably influenced by both gallbladder and appendix.

Another case I wish to report is one with a teratoma originating from the left ovary, and weighing 11 pounds. It consisted of a multilocular cyst with teeth, hair and bone, the bone being a section of an orbit. The location of the tumor, the greater portion being above the level of the navel, added considerably to the speculation as to what it was before operation.

The woman was 37 years of age, married, a native of Finland. Weight 120 pounds. She had worked on a farm until coming to the hospital.

She was married at 24 years, never pregnant. In 1915 she was operated for retroversion and a growth on the left ovary. She never felt as well after the operation as before, but her general health was comparatively good until last year. She has had increasing heartburn, is hungry, but cannot eat because of an uncomfortable pressure in the abdomen. The bowels are regular. She was examined two years ago and told she had a tumor as big as an orange. Since then she has noticed her abdomen increasing gradually in size.

Blood pressure on examination was 118/80, pulse 80. The abdomen appeared like a nine months pregnancy.

Firm, rounded, tumorous masses were felt four inches above the navel extending to the right and left for a distance of five inches on either side of the navel. The greater part of the tumor seemed to be from the navel upward. Pelvic examination revealed a large rounded mass also, with no especial tenderness. Air inflation of the rectum produced only discomfort in the epigastrium with no coils of bowel visible. Fluoroscopic examination of stomach showed a very small stomach lying horizontally against the diaphragm. The liver is up to the fourth interspace. The costal arch is widely separated.

Operation.—Incision was made in the right rectus near the center, a markedly thickened bluish omentum which was attached to the tumor at a number of points and free clear watery fluid presenting. No bowels were seen. After considerable difficulty in establishing our anatomy we found

the growth occupied the whole lower two-thirds of the abdomen, small bowels and transverse colon lying in the epigastric space while the stomach, the ascending colon, sigmoid and rectum were upon a stretch from pressure upward and their mesenteries had been greatly elongated. The left broad ligament was thinned out in a fan shape and had its attachment to the tumor on the level of the navel. The liver was compressed, had many adhesions and the surface was roughened as in a hepatitis. Its color was whitish from scar tissue. The gallbladder wall was thickened and considerably distended. Kidneys and spleen seemed normal in size. Stomach and duodenum were normal. The uterus was flattened out to the thickness of a hand. The right ovary was a cyst and was removed. The appendix had been removed at a former operation. This patient maintained a pulse of 90 all during the operation, was given intravenous saline before leaving the table and went to her room with a pulse of 80.

A patient, J. T. J., aged 32, gave the history that he had been gassed and severely wounded in France. He had been under observation for the past three years for chronic nephritis. One year ago he complained of pain in the abdomen in the region of the navel, pain in the back and constipation. The abdominal pain gradually grew worse. At home he was relieved by enemas.

He consulted Dr. F. Spicer September 2, 1924, with the following symptoms: Very severe pain in the abdomen radiating to the back, partially relieved by enemas. Other symptoms of chronic nephritis and hypertension.

On examination he showed a large palpable, pulsating tumor in the abdomen below the umbilicus, slightly to the left of median line. No murmurs nor thrills were elicited.

Briefly a diagnosis of abdominal aneurism was made. There was a difference of opinion in regard to the mass and an exploratory laparotomy was done. An aneurism about five inches long and three and a half inches wide in the greatest diameter was found lying under the bulging more to the left of the navel. The lower end of the aneurism was found near the bifurcation of the aorta. The mesentery above the aneurism was on a stretch with the vessels dilated. Immediately following the operation the patient felt considerably relieved, but after about ten days the pain returned, greatly increasing in severity, until only hypodermics of morphin relieved him. The constipation was very marked and an enema usually gave him some relief. The blood pressure upon admission, September 2nd, was 210/130, on October 1st, 160/110.

On October 8th at 5:30 a. m. the patient died very suddenly from hemorrhage.

DISCUSSION

Dr. J. P. Schneider, Minneapolis: Mr. Chairman—I presume my excuse for discussing a surgical paper in the surgical section is that I am firmly convinced that an internist unassociated intimately with a surgeon is an unsafe internist, and likewise that a surgeon unassociated with an internist is an unsafe surgeon.

To illustrate—in the paper prior to Dr. Bagley's, relative to perforated gastric ulcer, I am sure that the average unassociated internist confronted with this urgent surgical problem, would be inclined to be too dilatory and spend too much valuable time in arriving at a diagnosis. This will occur again and again unless the internist will follow the surgeon into the operating room and there be impressed with the pathology. On the other hand, what is the besetting sin of the average unassociated surgeon? It is that he operates altogether too frequently, perfectly honestly, upon psychoneurotics and patients with organic nerve disease simulating an abdominal surgical lesion. He knows it and we all know it and the only way in which he can be properly safeguarded, is to have a good internist and a good neurologist protect him.

I cannot bring that lesson home better than to cite a case in point which I saw last night in the western part of the state where I was called because two local surgeons had come to an impassé. One said it was gallbladder and the other said it was angina pectoris. Instead of the patient having either, she had a psychoneurosis-phrenocardia (Hertz). This woman, thirty-five years old, lived on a farm and had had in a brief span five children. In her last pregnancy, she had had a severe eclampsia, which left her so frightened as to make it seem to her imperative that she have no more children and the easiest way in which she could accomplish this was to act sick. Now to dig that fact out was the important thing.

I think Dr. Bagley's rare cases show that the abdomen is a wonderful hiding place—it takes us years of practice in order to become relatively certain of obscure points. It takes even longer to become a good chronologist and develop a good history, and, lastly, we must constantly be on the watch for those human beings who are sick in soul, but not in body.

Dr. J. A. Johnson, Minneapolis: The subject of diagnosis of abdominal lesions is a large one and has many varied aspects. The cases cited in Dr. Bagley's paper are largely atypical from the standpoint of history and physical findings. It is not difficult to diagnose the case with typical findings—the hospital interne can usually do that. There are, however, a large group of atypical cases that require careful investigation. I would like to call your attention for a moment to a group of cases with abdominal symptoms that are due to extra-abdominal lesions. Among the most important of these are diaphragmatic pleurisy, right lower lobe pneumonia—especially in children—the referred pain being transmitted through the intercostal nerves; gastric crisis in tabes; the nerve root pains transmitted to the abdomen in lesions of the spine—notably in malignant growths and tuberculosis; herpes zoster in its early stages may also simulate abdominal lesions. In all of these, the pain is superficial and should not lead one astray. The pains of angina pectoris may simulate an upper abdominal lesion and I have seen gallbladder lesions that were diagnosed as angina pectoris.

Then, there is a large group of psychoneurotics presenting themselves with numerous complaints. These are difficult because they have to be proven negative and often require a great deal of time and consultation for a final decision.

Dr. W. R. Bagley (closing): I think the surgeon, being a man of action, is often too impatient to see results. I am sure Dr. Schneider's remarks are very pat and right. We do need the balancing judgment of the internist and I certainly appreciate my associates' help on all these cases.

THE RELATION OF THE DOG TO PUBLIC HEALTH*

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Minneapolis

From time immemorial the dog has been man's closest friend. He has gradually worked himself into the human household, so that at present he is usually considered as a member of the family. He has conquered all his competitors for these privileges, except, perhaps, the cat and the pet birds. There is no question about the fact that he is a true friend to man. He has repeatedly saved human life and often gave his own to save that of his master. In spite of it all, however, the dog is a source of danger to man, because his master has removed all restrictions from him. Unwillingly and unconsciously the dog may carry disease from one person to another. He may easily carry tuberculosis, infectious diseases, rabies, skin diseases, and intestinal parasites. The dog is not to blame for all of this; the blame must rest on his master who allows the dog to eat either raw or dirty food, allows him to run around and intermingle with persons or animals infested with disease. The dog returns home and carries disease to the household.

That the dog may be a source of danger was emphatically impressed upon us by the observation that the majority of dogs operated on for experimental purposes were found to contain animal parasites, even though they were apparently healthy. It is surprising how little attention has been paid to this topic when one considers the many public health, hygiene, and preventive medicine organizations. Very little has been written with a view to emphasize the dog as a carrier of disease. The few good papers have, unfortunately, been buried in very inaccessible or specializing publications. Hall (M. C. Hall: The Dog as a Carrier of Parasites and Disease; U. S. Dept. of Agriculture, Bulletin No. 260, Nov. 23, 1915) wrote an excellent article that deserves very wide publicity. Cameron (Thomas Cameron: The Dog as a Carrier of Disease to Man; Lancet, March 18, 1922, p. 564) also wrote a very instructive article, but it is limited to problems that concern England primarily. It may be well to mention other less important articles:

1. In Dirty Dogdom (British Medical Journal, vol. 2, p. 85, July 15, 1916).

2. When a Dog Becomes a Nuisance (A. H. Bush: Public Health, Michigan State Board of Health, January, 1917, pp. 20-22).

3. On the Prevalence of Entozoa in the Dog, With Remarks on Their Relation to Public Health (Proceedings of the Linnean Society Zool. Section, vol. 9, p. 281, 1868).

4. Les Parasites Transmissibles des Animaux a l'homme, Envisages Specialement au Point de Vue de la Prophylaxie (a Railliet, Transactions of 7th International Congress of Hygiene and Demography, 1892, vol. 3, section 3, pp. 57-87).

It is perhaps sufficient only to mention the various diseases that the dog may carry. Two of the most important are tuberculosis and rabies. In the first case the dog acts as a carrier of the tubercle bacilli by coming in contact either with a diseased human or else with contaminated articles. In rabies, the dog acts as an intermediate host of the rabies virus. The parasites carried by the dog may be conveniently classified under two heads, namely, skin parasites, and intestinal parasites. A more detailed differentiation may be given in an outline form:

I. SKIN DISEASES
- A. Ringworm
  - a. Trichophyton microsporum oospora
  - b. Eidamella
- B. Mange
  - a. Sarcoptic (transmissible to man)
  - b. Follicular or demodectic (may be transmissible to man)
  - c. Auricular (not transmitted to man)
- C. Lice and Fleas
  - a. Trichodectes canis (host of dog tapeworms)
  - b. Pulex iritans
  - c. Stenocephalus canis
- D. Chiggers
  - (Attack man but common in tropical countries)

*From the laboratory of experimental surgery, The Medical School, University of Minnesota. Read before the Hennepin County Medical Society, Minneapolis, Minn., on February 4, 1925.

E. Ticks
  a. Dermacentor variabilis
  b. Dermacentor venistus (carrier of Rocky Mountain spotted fever)

II. Intestinal Parasites

A. Protozoa
  a. Entameba histolytica
  b. Giardia intestinalis
  c. Trypanosoma evansi (not yet reported in U. S. A.)

B. Nematodes (round worms)
  a. Toxascaris limbata
  b. Eustrongylus gigas
  c. Trichinella spiralis

C. Trematodes (flukes)
  a. Opisthorchis felineus
  b. Paragominus kellicotti (lung fluke of hogs)
  c. Clonorchis sinensis (common in Japan and China)
  d. Clonorchis endemicus (common in Japan and China)
  e. Schistosoma japonicum (common in Japan and China)

D. Cestodes (tapeworms)
  a. Echinococcus granulosus
  b. Coenurus cerebralis (gid)
  c. Dipylidium caninum
  d. Dibothriocephalus latus

III. Arachnida

A. Tongue worms
  (Linguatula rhinaria)

It is evident from this brief outline that the dog is a definite source of danger if no restrictions are placed upon him. To remedy existing conditions the most important consideration to remember is to treat the dog as a dog and not as a human being. Dispose of all stray dogs. Insist on muzzling dogs, especially when they are out on the street. Treat them periodically with vermifuges. Keep them free from skin parasites. Test dogs in houses where tuberculosis or other transmissible disease is present. Don't allow the dog to eat from the same plate which you use. Don't allow the dog to become too familiar with the children. Castration is frequently a means of keeping the dog at home.

BLOOD PRESSURES DURING PREGNANCY, LABOR, AND PUERPERIUM*

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For many years blood pressure has occupied a position of great importance in the minds of obstetricians, and a vast amount of literature has accumulated relative to hypertension and toxemia in late pregnancy. In spite of these facts comparatively little work has been done in the study of blood pressures in normal pregnancy, labor, and puerperium.

May it not be that the same toxins which in a relatively small number of cases give rise to the symptoms of a true toxemia are present and exert their influence to a less marked degree in cases of normal pregnancy? Would the effects of such toxins be counteracted or would they be accentuated by the increasing size of the intra-abdominal uterine mass with its increased vascular area? These questions and many others of equal significance arise in the consideration of blood pressure changes during gestation, parturition, and the puerperium.

The purpose of this paper is to show the trend of blood pressure in normal pregnancy, to add a little to the information at hand concerning the blood pressure reaction of the maternal organism during and after labor and in the puerperium. Various factors which may influence the maternal blood pressure and pulse rate are considered.

Bailey, in 1911, states that the average blood pressure in the last weeks of pregnancy is 118, and adds that any blood pressure over 150 should be investigated.

Danforth, in 1918, in reporting pregnancy observations in 115 private cases, concludes that (1) the average blood pressure of the pregnant woman is less than that of the non-pregnant, and (2) in many cases labor causes a rise of arterial tension.

In a series of fifty cases with observations during pregnancy and labor, Voegeler, 1907, shows that the normal limits of blood pressure during pregnancy are 100 to 150 in all cases. He also states

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that during labor the pressure is higher, but after delivery any pressure above 150 or under 90 must be considered abnormal.

Donaldson, in 1913, after a study of apparently normal cases of pregnancy and labor, concluded that there is no increase in blood pressure during pregnancy and no fall following delivery.

Discussing an article by Hirst, 1915, Norris remarked that the average blood pressure in the early months of pregnancy is between 110 and 130, and adds that there is little change as pregnancy advances.

Warfield defines the phases of the auscultatory method of taking blood pressure, placing the systolic pressure at that point where a short, sharp click is first heard, and the diastolic pressure at the level where the loud tone (third) suddenly becomes dull. He then adds that diastolic pressure is not only more important than systolic, but also not so variable.

In 1909 Skeel concludes (1) that with the slight rise occurring in the last two months of pregnancy, the blood pressure should not exceed 150; (2) that anything in excess of 150 should be considered abnormal, and (3) that blood pressure is somewhat elevated during labor, and if high, it should decrease to normal after labor.

From a series of 450 cases, Newell, 1915, places the average systolic pressure at 118, with a gradual rise of 10 to 15 in the latter months of pregnancy. In this series there was one patient who had abnormal symptoms, with a blood pressure between 100 and 130.

In a series of 524 cases Litzenberg found that 80 per cent of the patients had blood pressures of 130 or less, and in 60.5 per cent the systolic pressure ranged from 100 to 130. Fifty per cent of patients with a systolic pressure of 160 to 180 have toxemia, while every patient with systolic pressure ranging above 180 has toxemia. He concludes (1) that the normal systolic blood pressure in pregnant women is 100 to 130; (2) that the normal diastolic blood pressure is from 60 to 85, and (3) that the normal pulse pressure is from 30 to 50.

Blood pressures, systolic and diastolic, together with the pulse rate, were taken on 100 unselected private patients at the Swedish Hospital. A Baumanometer was used, the systolic pressure being noted at the point where the sound first reappears and the diastolic pressure at the point of transition from the loud systolic note to the dull and feeble sound heard just before the disappearance of all sound. The pulse rates were taken for periods varying from fifteen seconds to one minute.

Such readings were taken on each of the 100 patients, beginning during labor. In the primiparous cases the labor readings were taken during the second stage of labor, while in the multiparous cases the readings were taken in the first stage, but in no case was the blood pressure taken during a pain. As soon after delivery as it was technically possible the "after labor" readings were taken, but because of the variable time used in perineal repair the time element of this reading varied. Following labor, readings were taken at twelve hours, twenty-four hours, two days, three days, and so forth, to the time of discharge from the hospital. The daily blood pressure and pulse rate were taken between ten o'clock and twelve noon.

Table 1

SYSTOLIC BLOOD PRESSURE READINGS IN RELATION TO LABOR

Entire Series						Antepartum Group									
						Antepartum					Postpartum				
Time	No. of cases	Range	Average	Mode	Median	Consecutive	No. of cases	Range	Average	Mode	Median	Time	No. of cases	Range	Average	Mode	Median
D L	100	104-168	130.64	120	126	2 n.	9	90-124	107.11	110	110	D L	28	106-168	129.82	120	122
A L	100	78-196	128.62	120	122	3 n.	11	90-128	109.63	110	110	A L	28	102-196	130.53	114	118
12 h.	100	94-164	119.78	120	116	4 n.	16	96-126	110.61	110	120	12 h.	28	100-164	119.28	110	116
24 h.	100	96-166	117.46	110	114	5 n.	15	92-128	111.66	114	124	24 h.	26	100-162	114.08	110	110
1 d.	100	96-174	117.76	110	114	6 n.	22	90-134	110.27	114	120	2 d.	27	100-174	114.00	110	110
2 d.	100	92-174	117.24	110	114	7 n.	21	92-128	114.48	116	124	3 d.	27	92-160	113.08	110	112
3 d.	100	92-168	116.66	114	114	8 n.	24	98-128	114.91	114	124	4 d.	27	100-152	116.14	112	114
4 d.	100	90-160	115.40	108	112	9 n.	22	90-142	117.22	116	124	5 d.	27	90-160	114.45	110	110
5 d.	100	92-164	114.94	120	114	9 n.	20	100-140	118.90	120	124	6 d.	27	92-150	114.15	112	112
6 d.	100	96-158	114.62	110	114	9 n.	22	102-148	120.63	122	130	7 d.	27	96-144	112.51	114	114
7 d.	100	96-154	113.66	110	112	9 n.	18	100-160	119.17	128	122	8 d.	27	96-140	112.96	110	110
8 d.	90	94-154	113.76	110	112	10 n.	8	110-128	118.49	118	118	9 d.	27	100-136	112.22	106	110
9 d.	75	92-150	113.01	116	114	10 n.	5	110-124	116.00	124	118	10 d.	27	100-136	113.11	104	112
10 d.	68	96-148	113.70	110	114							11 d.	24	98-134	111.58	110	110
11 d.	54	96-130	111.66	110	110							12 d.	19	96-130	110.21	110	110
12 d.	20	100-124	111.60	100	110							13 d.	15	100-126	110.45	100	110
13 d.	15	96-124	109.60	110	110							14 d.	6	96-126	109.75	110	110
												3 w.	27	90-126	109.00	110	

Pre-eclamptic Group						Pituitrin Group						Morphine Group					
D L	6	160-188	168.0	164	164	D L	24	112-168	132.41	132	132	D L	5	120-152	132.60	124	128
A L	6	132-196	161.3	148	148	A L	24	78-168	123.58	120	122	A L	5	114-124	115.60	114	114
12 h.	6	136-164	150.0	164	146	12 h.	24	96-164	121.08	110	120	12 h.	5	110-114	111.20	110	110
24 h.	6	122-166	153.0	156	156	24 h.	24	96-162	120.20	112	114	24 h.	5	102-114	109.20	110	110
1 d.	6	132-170	154.6	154	154	2 d.	24	100-152	119.41	112	114	2 d.	5	100-112	107.60	106	106
2 d.	6	132-174	150.3	154	154	3 d.	24	90-154	119.00	120	118	3 d.	5	96-114	106.40	110	110
4 d.	6	126-168	150.0	150	150												
5 d.	6	122-160	147.6	160	148	Castor oil and quinine Group											
6 d.	6	114-164	141.0	140	140												
7 d.	6	124-168	140.3	124	142	D L	6	106-138	122.33	138	118						
8 d.	6	124-154	139.3	138	138	A L	6	86-132	109.66	106	106						
9 d.	5	126-154	136.0	134	134	12 h.	6	102-130	114.33	120	116						
10 d.	5	128-150	136.2	128	134	24 h.	6	106-114	111.00	110	110						
11 d.	5	116-168	136.0	130	130	2 d.	6	110-130	116.00	110	110						
12 d.	2	116-130	124.0	120	128	3 d.	6	104-128	110.66	112	112						

D L -- During labor
A L -- After labor
h ----- Hour
d ----- Day
w ----- Week
m ----- Month

Owing to the fact that these patients were in the hands of the various staff doctors, some of them were allowed to go home on the eighth day, some on the ninth, and so forth. Consequently the number of cases decreased from the eighth to the fourteenth day. Data were obtained on 100 cases for eight days, on ninety for nine days, and on seventy-five, forty-eighty, thirty-four, twenty, and fifteen respectively from the tenth to and including the fourteenth day. Through the courtesy of Dr. F. L. Adair the readings six weeks postpartum were obtained from twenty-seven patients of this group.

Thus far the work included only labor and postpartum observations, but following a suggestion from Dr. F. L. Adair, and through his courtesy, antepartum readings were obtained in twenty-seven cases. The method used in these cases corresponds to that described above. These observations include nine cases in the second month of pregnancy, eleven in the third, sixteen in the fourth, eighteen in the fifth, twenty-two in the sixth, twenty-one in the seventh, twenty-four in the eighth, twenty-two in the first week of the ninth month, twenty in the second week, twenty-two in the third week, and eighteen in the fourth week. Eight cases were overdue one week, and five cases were overdue two weeks or more; hence there are thirteen readings in the tenth month of pregnancy.

Table 1
DIASTOLIC BLOOD PRESSURE READINGS IN RELATION TO LABOR

Entire Series						Antepartum Group											
						Antepartum						Postpartum					
Time	No. of cases	Range	Average	Mode	Median	Gestation	No. of cases	Range	Average	Mode	Median	Time	No. of cases	Range	Average	Mode	Median
D 1	100	56-108	81.66	80	80	2 mo.	9	48-78	65.38	70	70	D 1	25	60-108	73.84	84	68
A L	100	48-128	79.46	80	80	3 mo.	11	60-78	64.36	70	70	A L	25	56-124	72.52	84	72
12 h.	100	54-100	72.84	70	72	4 mo.	16	50-80	64.07	68	68	12 h.	25	54-104	72.72	80	70
24 h.	100	52-108	72.12	70	70	5 mo.	18	50-76	63.22	70	64	24 h.	25	52-108	71.16	70	70
1 d.	100	58-104	73.04	70	72	6 mo.	22	50-78	65.18	70	66	1 d.	25	56-104	72.68	70	70
2 d.	100	54-104	72.32	70	70	7 mo.	21	50-78	67.62	70	70	2 d.	25	54-104	72.64	70	70
3 d.	100	54-108	72.12	70	72	8 mo.	24	54-78	66.33	68	70	3 d.	25	56-108	72.52	68	70
4 d.	100	54-108	72.48	70	72	9 mo.	22	54-80	70.10	68	72	4 d.	25	56-104	72.68	74	72
5 d.	100	54-100	72.48	70	72	9 mo.	20	60-84	70.80	68	70	5 d.	25	54-100	72.04	68	70
6 d.	100	54-108	72.04	70	72	9 mo.	18	62-82	72.76	72	72	6 d.	25	56-100	72.28	72	72
7 d.	100	54-108	72.04	70	72	9 mo.	22	64-82	73.36	70	72	7 d.	25	54-100	72.68	72	72
8 d.	100	48-108	72.04	70	72	9 mo.	22	62-82	73.72	72	72	8 d.	25	50-100	72.04	72	72
9 d.	100	54-108	72.36	70	72	9 mo.	22	64-84	73.54	72	72	9 d.	25	54-100	72.04	72	72
10 d.	79	60- 90	72.72	72	72	10 mo.	8	64-78	70.50	70	70	10 d.	25	56-100	72.44	68	72
11 d.	68	58-100	72.41	72	72							11 d.	25	58- 92	72.24	72	72
12 d.	56	60- 82	72.19	70	72							12 d.	25	60- 90	72.52	70	72
13 d.	50	62- 86	72.92	70	70							13 d.	25	60- 90	72.04	70	70
14 d.	18	60- 80	71.20	72	72							14 d.	8	60- 80	71.00	72	72
												15 d.	5	62- 78	68.60	70	70

Pre-eclamptic Group						Pituitrin Group						Morphine Group					
D 1	6	100-108	103.0	100	100	D 1	24	48-104	80.61	80	82	D 1	6	70- 90	80.00	82	82
A L	6	74-124	109.3	90	96	A L	24	42-128	78.58	70	76	A L	6	70- 84	76.00	74	74
12 h.	6	96-108	99.6	96	96	12 h.	24	54-104	76.75	70	76	12 h.	6	64- 74	69.33	70	70
24 h.	6	84-108	98.6	96	96	24 h.	24	54-100	74.50	70	74	24 h.	6	64- 74	70.00	70	70
1 d.	6	74-108	98.3	104	100	1 d.	24	52-104	75.29	72	76	1 d.	6	64- 76	70.00	70	70
2 d.	6	74-108	97.6	96	96	2 d.	24	54-104	76.62	70	78	2 d.	6	66- 80	69.60	70	70
3 d.	6	84-108	98.6	96	96												
4 d.	6	84-104	98.6	100	98	Castor Oil and Quinine Group											
5 d.	6	86-104	98.6	100	98							D L -- During labor					
6 d.	6	84-100	98.0	96	96							A L -- After labor					
7 d.	6	86- 98	93.4	96	96	D 1	6	60- 80	69.66	72	70	h ---- Hour					
8 d.	6	80- 96	91.3	96	96	12 h.	6	64- 84	71.00	70	70	d ---- Day					
9 d.	6	78- 98	89.0	96	96	24 h.	6	60- 84	69.33	72	68	w ---- Week					
10 d.	6	80- 96	89.6	96	96	1 d.	6	60- 78	68.00	70	68						
11 d.	6	78-100	89.6	88	88	2 d.	6	60- 76	68.00	70	70						
12 d.	6	80- 98	91.0	88	88	3 d.	6	64- 76	70.00	70	70						

clude nine cases in the second month of pregnancy, eleven in the third, sixteen in the fourth, eighteen in the fifth, twenty-two in the sixth, twenty-one in the seventh, twenty-four in the eighth, twenty-two in the first week of the ninth month, twenty in the second week, twenty-two in the third week, and eighteen in the fourth week. Eight cases were overdue one week, and five cases were overdue two weeks or more; hence there are thirteen readings in the tenth month of pregnancy.

In analyzing the data in these twenty-seven antepartum cases, pulse pressures were calculated from the systolic and diastolic pressures noted each month, and graphs were made of both these pressures, the pulse pressure, and the pulse rate.

ANTEPARTUM GRAPH

A graph of these cases shows that there is an irregular but gradual rise in each series through pregnancy. During the first two weeks of the tenth month the systolic and diastolic blood pressures and the pulse rate drop slightly, but this may be due to the fact that for these observations data were obtained in only thirteen cases.

The average systolic pressure (Table 1) shows the most uniform curve, gradually rising from 107.1 in the second month of pregnancy to 119.1 during the ninth month, from which point it drops to 118 in the second week of the tenth month of pregnancy. These findings agree with those of Schulze, 1920, who found that the average blood pressure is slightly higher during the latter months of pregnancy; but the average at term which we found to be between 118 and 119 is slightly lower than his observations of 123 in seventy-five cases. It does, however, agree with the findings of Bailey in 1911.

The diastolic pressure (Table 2) is slightly more irregular, yet it gives a gradual rise from 65.4 in the second month of pregnancy to 73.8 during the fourth week of the ninth month, with a subsequent drop in the tenth month in those patients who were overdue. There is, however, a break in this curve, showing a decrease in the diastolic pressure during the fifth and sixth months.

The pulse pressure (Table 3) gives a somewhat different picture, showing a drop from 42 to 41 during the second month of pregnancy, a definite rise from the third to the fifth month, a still greater rise during the seventh month, and then an irregular but gradual fall to the fourth week of the ninth month of pregnancy, after which it again rises in the first week of the tenth month. It can be seen from the graph that there is a gradual increase from the second month of pregnancy to term.

As with the other three factors, the pulse rate (Table 4) also shows a gradual increase during

Table 3
PULSE PRESSURE IN RELATION TO LABOR

Entire Series						Antepartum Group											
						Antepartum						Postpartum					
Time	No. of cases	Range	Average	Mode	Median	Gestation	No. of cases	Range	Average	Mode	Median	Time	No. of cases	Range	Average	Mode	Median
D 1	100	24-80	47.74	50	48	2 mo.	9	28-56	41.77	38	44	D 1	25	32-68	48.88	50	46
A L	100	22-84	45.96	44	44	3 mo.	11	30-54	41.00	42	42	A L	25	30-72	48.76	48	46
12 h.	100	24-78	46.46	40	46	4 mo.	16	32-67	43.93	36	42	12 h.	25	30-64	46.32	44	46
24 h.	100	24-70	44.80	50	44	5 mo.	18	34-64	44.44	44	44	24 h.	25	30-70	47.52	40	42
1 d.	100	28-70	44.22	40	44	6 mo.	22	32-68	46.18	44	46	1 d.	25	30-70	47.15	38	40
2 d.	100	26-74	44.22	40	44	7 mo.	21	34-68	47.90	48	48	2 d.	25	28-64	42.22	40	42
3 d.	100	22-66	43.72	40	42	8 mo.	24	36-74	48.12	48	46	3 d.	25	30-68	43.77	42	44
4 d.	100	22-70	42.60	36	42	9 mo.	22	36-90	47.09	50	46	4 d.	25	30-60	41.44	48	42
5 d.	100	20-64	41.78	42	42	9 mo.	20	34-66	46.90	50	46	5 d.	25	30-60	41.88	38	42
6 d.	100	22-66	41.98	42	42	9 mo.	22	34-68	48.27	40	48	6 d.	25	30-64	40.09	40	40
7 d.	100	22-68	41.02	38	40	9 mo.	18	34-68	44.11	48	42	7 d.	25	30-64	40.41	38	40
8 d.	100	24-68	40.84	40	40	9 mo.	22	34-68	44.11	48	42	8 d.	25	30-64	40.41	38	40
9 d.	90	22-64	40.20	36	40	10 mo.	8	34-68	47.00	42	46	9 d.	25	30-64	40.81	36	36
10 d.	78	20-60	41.04	44	42	10 mo.	8	34-80	47.20	48	48	10 d.	25	32-60	39.88	36	38
11 d.	68	26-68	40.80	40	40							11 d.	25	30-60	39.83	42	40
12 d.	56	30-62	39.80	36	40							12 d.	25	30-58	39.15	36	40
13 d.	50	30-58	41.20	44	42							13 d.	25	30-60	41.28	40	40
14 d.	18	28-68	37.60	38	38							14 d.	8	34-44	40.00	38	38
												15 d.	5	32-54	41.33	40	

Pre-eclamptic Group						Pituitrin Group						Morphine Group					
D 1	6	64-80	68.0	62	68	D 1	24	24-68	48.92	48	48	D 1	6	42-56	52.00	50	50
A L	6	62-72	67.0	58	68	A L	24	20-94	48.16	46	46	A L	6	32-48	37.60	36	36
12 h.	6	48-72	59.3	60	60	12 h.	24	24-64	46.42	40	42	12 h.	6	40-48	41.60	40	40
24 h.	6	36-70	56.0	62	54	24 h.	24	24-68	46.09	48	44	24 h.	6	36-48	39.20	40	40
1 d.	6	48-70	60.0	58	58	1 d.	24	22-68	44.13	40	42	1 d.	6	32-44	37.60	38	38
2 d.	6	50-70	61.3	60	60	2 d.	24	24-68	43.48	40	42	2 d.	6	32-44	36.80	40	40
3 d.	6	48-68	57.0	56	56												
4 d.	6	48-68	57.3	56	56	Castor oil and Quinine Group											
5 d.	6	40-64	53.3	60	58							D L -- During labor					
6 d.	6	42-64	55.0	50	50	D 1	6	40-56	52.64	50	52	A L -- After labor					
7 d.	6	36-58	48.5	58	48	A L	6	36-44	38.66	36	36	h ---- Hour					
8 d.	6	40-58	48.8	44	44	12 h.	6	36-48	44.66	44	44	d ---- Day					
9 d.	6	36-54	50.0	48	48	24 h.	6	36-48	44.66	44	44	w ---- Week					
10 d.	6	42-54	47.8	48	48	1 d.	6	32-48	43.00	46	48	m ---- Month					
11 d.	6	42-56	47.6	50	50	2 d.	6	32-48	44.00	40	40						
12 d.	6	36-50	43.0	50	50	3 d.	6	36-48	43.66	48	48						

pregnancy from 84 during the second month to 95 or 97 at term.

This graph shows that in the four factors there is a gradual, broken, and irregular increase from the second month of pregnancy to term.

Data obtained during and after labor, as described above on this group of twenty-seven cases, show, as does the graph for the averages on the entire group of 100 cases, a sudden rise during labor and a gradual decrease from that time until six weeks after delivery.

Table 6
PULSE RATE IN RELATION TO LABOR

Entire Series						Antepartum Group									
						Antepartum						Postpartum			
Time	No. of cases	Range	Average	Mode	Median	Deviation	Probable error	Range	Average	Mode	Median	Time	No. of cases	Range	Average	Mode	Median
D L	100	60-120	87.14	90	88	P m. 9	76-100	84.77	80	84	D L	28	66-118	89.02	90	90
A L	100	60-120	84.44	85	88	5 m.11	70-108	94.72	100	80	A L	28	67-110	86.11	90	87
11 h.	100	48-130	88.78	80	80	A m.14	74-110	88.48	88	88	11 h.	28	48-100	80.10	80	80
24 h.	100	56-128	85.06	80	80	5 m.18	72-112	89.86	100	88	24 h.	28	56-100	81.32	80	80
1 d.	100	60-110	85.41	80	86	6 m.24	72-112	91.01	88	98	1 d.	28	60-100	81.68	80	80
3 d.	100	66-106	84.11	80	82	7 m.31	72-104	86.72	96	92	3 d.	27	74-106	84.08	80	84
4 d.	100	70-110	86.80	86	86	8 m.34	70-118	96.80	96	96	4 d.	27	70-108	83.78	85	85
5 d.	100	68-110	84.48	80	86	9 m.37	84-112	96.80	96	96	5 d.	27	70- 98	82.44	80	83
6 d.	100	68-120	87.14	86	86	9 m.40	86-106	96.80	96	96	6 d.	27	70-100	84.08	85	85
7 d.	100	70-118	86.58	80	86	9 m.43	84-120	97.67	96	96	7 d.	27	70- 98	84.70	80	85
8 d.	100	68-100	86.36	80	86	9 m.46	80-110	95.78	96	96	8 d.	27	70-100	84.44	80	85
9 d.	99	66-108	86.16	80	86	10 m. 1	86-110	96.60	106	94	9 d.	27	76- 98	83.96	80	85
10 d.	78	68-110	86.76	80	86	10 m. 4	86-120	98.53	96	90	10 d.	27	66-100	82.66	80	80
11 d.	48	70-118	88.02	80	88						11 d.	26	70-108	86.16	88	80
12 d.	36	66-118	86.72	80	88						12 d.	19	70- 98	84.42	80	80
13 d.	21	70-116	91.66	80	80						13 d.	14	66- 90	81.28	80	78
14 d.	13	66-110	86.46	86	86						14 d.	9	84-110	88.77	90	80
											4 w.	27	72- 96	84.15	80	

Pre-eclamptic Group						Pituitrin Group						Morphine Group					
D L	6	70- 96	86.0	90	90	D L	24	60-124	89.08	90	86	D L	6	80-100	89.66	90	88
A L	6	70- 96	83.16	85	88	A L	24	62-118	86.46	90	88	A L	6	70- 90	81.02	90	80
11 h.	6	66-118	86.66	80	88	11 h.	24	66-120	89.66	90	88	11 h.	6	70- 90	81.66	80	80
24 h.	6	70-100	86.8	78	77	24 h.	24	70-120	90.08	80	88	24 h.	6	80- 98	89.00	98	90
1 d.	6	70-100	83.8	80	80	1 d.	24	66-108	86.04	88	88	1 d.	6	84-100	93.32	100	98
3 d.	6	72- 90	84.16	80	80	2 d.	24	66-108	84.04	88	88	2 d.	6	86- 98	92.66	90	90
4 d.	6	76- 96	86.00	80	86												
5 d.	6	80- 96	88.16	86	90	Castor oil and quinine Group						D L -- During labor					
6 d.	6	86- 96	89.66	86	88							A L -- After labor					
7 d.	6	80- 96	85.33	80	80	D L	6	80-120	94.00	90	90	h ---- Hour					
8 d.	6	76- 96	86.00	86	88	A L	6	76-120	91.16	88	88	d ---- Day					
9 d.	6	80- 96	88.8	90	90	11 h.	6	88-110	91.66	80	80	w ---- Week					
10 d.	6	80- 96	87.6	87	84	24 h.	6	76-110	89.66	90	88	m ---- Month					
11 d.	6	76- 90	84.0	90	88	1 d.	6	76-110	89.33	88	88						
12 d.	3	90	90.0	90	90	2 d.	6	76-106	91.16	88	88						

Frequency curves were made to demonstrate the modal pressures and pulse rate and to show the ranges and their variability in this group of antepartum cases.

ANTEPARTUM FREQUENCY GRAPH. SYSTOLIC

From this chart (Fig. 1) it may be seen that there is a gradual increase throughout pregnancy of all four factors, and that not only is there a gradual rise in the general level, but that both extremes also increase, as do the modal pressures.

The systolic curve shows a range during the second month of 90 to 124, while in the fourth week of the ninth month the variability is 100 to 160. There is a decrease in the upper limits in this case during the tenth month which corresponds to the chart of antepartum averages. It is also noted that the modal pressure, or the most frequent pressure, increases from 110 to 128 during pregnancy, though it falls during the tenth month because of a decrease in observations.

Diastolic pressure demonstrates the same type of curve, the range increasing from 48 to 78 to 62 to 82 during the last week of the ninth month. The modal diastolic pressure does, however, remain fairly constant, fluctuating from 68 to 72 with the majority of cases at 70.

Pulse pressure shows a somewhat irregular tendency to increase. The range varies from 38 to 56 in the second month to 34 to 62 at the end of the ninth month. Yet in the tenth month there is an increase of the lower limit and a slight decrease of the upper limit. The modal pressure varies from 38 in the second month to 50 during the first two weeks of the ninth month, following which there is a decrease. There is, however, a general tendency toward increase throughout pregnancy.

The pulse rate, which is the most unreliable factor throughout, conforms to the other curves. During the second month the rate varies from 70 to 100, while at term, at the end of the ninth month, the rate varies from 80 to 100. It also further increases from 86 to 120 during the second week of the tenth month. The modal pressure rises from 80 the second month to 96 at the end of the ninth month, and further increases to 106 in the tenth month.

It is somewhat more significant, however, that not only does the average pressure increase during pregnancy, a fact which might be attributed to cases of toxemia which appear in the latter months of pregnancy, but also that individual cases reveal a gradual increase of blood pressure and pulse rate, as seen in the accompanying chart.

Data obtained during and after labor, as described before in this group of twenty-seven cases, show, as does the graph for the averages on the entire group of 100 cases, a sudden rise during labor, and an immediate drop after delivery, and exhibits a gradual decrease, from that time until six weeks postpartum, in all four factors.

POSTPARTUM GRAPH; TWENTY-SEVEN CASES

It may be well to add that throughout this work the systolic pressure shows the greatest range of variability, the diastolic the least, while the pulse pressure and the pulse rate fluctuate more or less but still coincide fairly well with the general tendency of the other factors.

Here may be noted the sudden average drop from 129.5 during labor to 120.5 immediately following delivery, with a further fall during the first day postpartum to 114.9. This decrease is perhaps due to several factors, among which may

be noted: (1) decrease of intra-abdominal pressure; (2) hemorrhage incident to labor; (3) drug administration, and (4) anesthesia during labor. The influence of three of these factors will be taken up later. After the first day postpartum there continues an intermittent decrease in the average systolic pressure to 109.8 on the fourteenth day. Six weeks postpartum reveals a further decrease to 109.

Averages of diastolic blood pressure show a slight fall from 79.8 to 79.5 immediately after delivery and a much more abrupt fall during the balance of the first twenty-four hours postpartum, at which time it is found to be 71.2. There is then a short rise, after which it remains fairly level for seven days and gradually falls to 71 on the fourteenth day, and decreases to 66.6 at the end of six weeks postpartum.

The pulse pressure, which is found to be 45.5 during labor, increases to 46.3 twelve hours postpartum and then decreases intermittently to 37.2 on the twelfth day, after which it rises to 41.3 six weeks after delivery. The general trend is downward.

After an initial fall during the first twelve hours after delivery, the average pulse rate rises and falls until on the fourteenth day postpartum it is 83.8 or 4.2 below its height of 88 during labor. There is an additional fall to 83.1 six weeks after delivery.

FREQUENCY GRAPH—ANTEPARTUM AND POSTPARTUM

The sudden postpartum drop and subsequent gradual decrease of blood pressure is more strikingly presented in frequency curves from the same data (Fig. 2). Such a curve, as in the antepartum

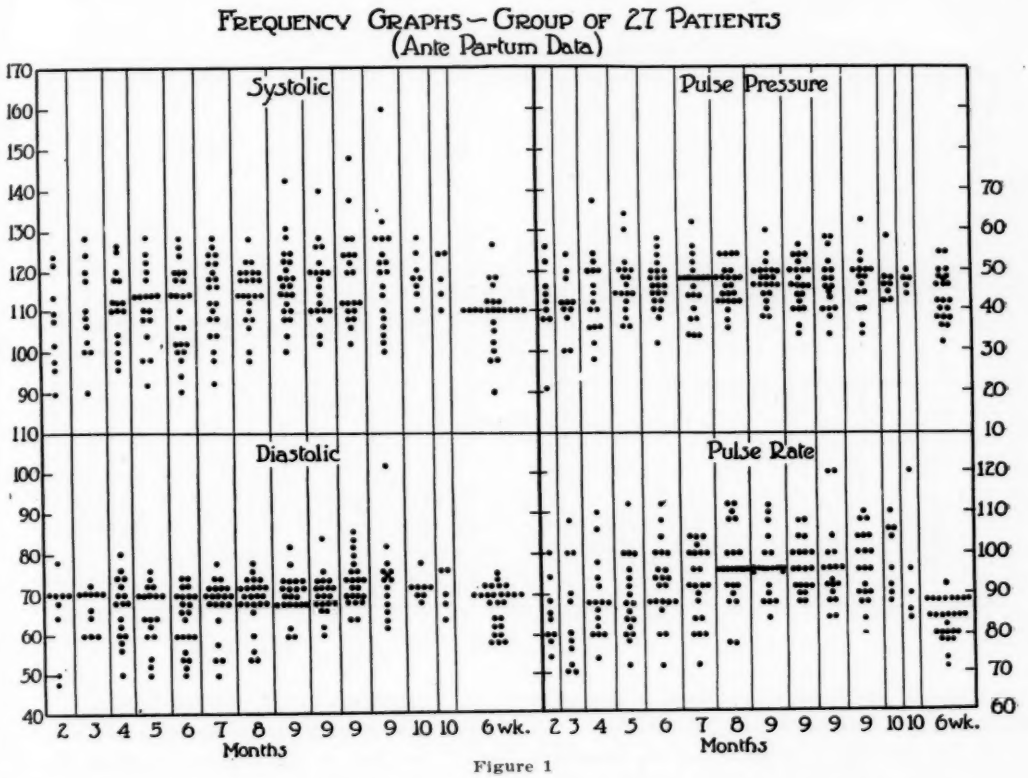

Figure 1

observations, substantiates the facts already mentioned and shows that in almost every case the same downward tendency is to be found.

Systolic pressures are found to vary from 90 to 196, whereas the modal or most frequent pressures vary only from 100 to 120. In one case, however, in which there were symptoms of pre-eclamptic toxemia there was a rise in systolic pressure from 168 to 196 during labor, with a drop to 90 six

weeks postpartum. In the same way the modal pressures decreased from 120 to 100 on the thirteenth day postpartum and rose again to 110 on the fourteenth day, which level it maintained until six weeks postpartum. The most frequent systolic modal pressure is found to be 110.

In this graph, as in the antepartum frequency curve, the diastolic pressure exhibits more stable qualities than any of the other factors. The range during labor is from 60 to 104, while fourteen days postpartum it is from 60 to 80; and a further decline is found at six weeks, from 52 to 75. During and after delivery the modal pressure remains at 84. At twelve hours it drops to 80, at twenty-four hours to 70, at about which level it fluctuates throughout the balance of the observations.

The pulse pressure and pulse rate are somewhat more variable and their curves more uneven. Pulse pressure shows a range of from 32 to 68 during labor and varies only in the upper extreme, which drops to 54. The modal pressure of this factor is found to be 50 during labor, and it decreases to 36 on the ninth day, but rises again to 42 on the eleventh day. The extremes of the pulse rate vary quite irregularly and maintain a fairly constant level throughout, being 65 to 115 during labor and 65 to 110 on the fourteenth day. The modal pulse rates vary from 90 to 80 with no apparent definite scheme.

Thus it has been seen that throughout twenty-seven cases the average modal and extremes of systolic, diastolic, and pulse pressures pass through a period of ascendency from the second month of pregnancy to term, then record a sudden rise during labor, which decreases markedly immediately following labor, and then gradually decreases until it reaches a practically normal level six weeks postpartum. The pulse rate in general follows the same rule, though its curve is more irregular, intermittently high and low, both as to average and modal characteristics.

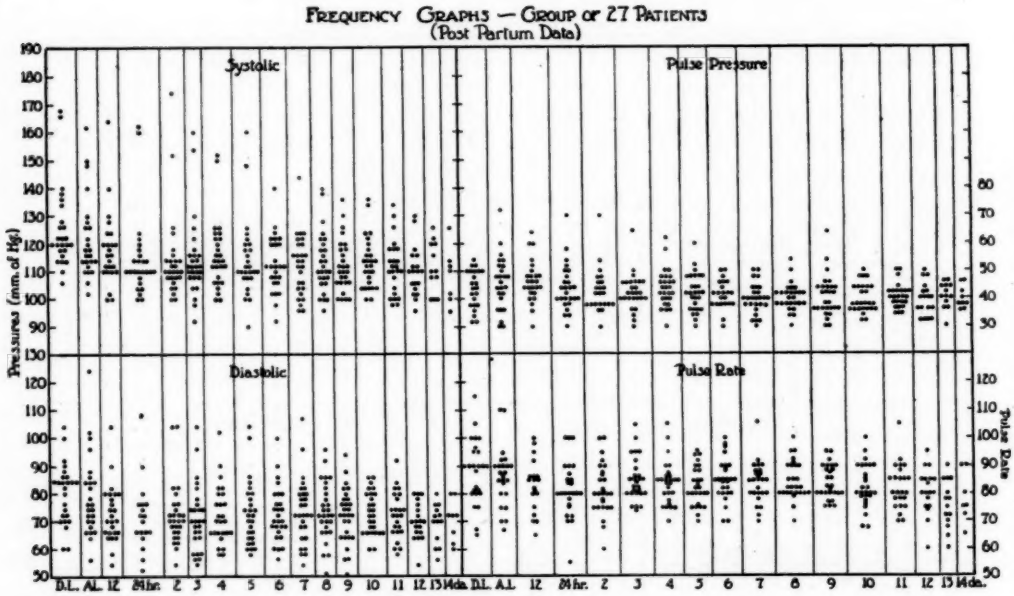
Frequency Graphs — Group of 27 Patients
(Post Partum Data)
Systolic
Pulse Pressure
Diastolic
Pulse Rate
Pressures (mm. of Hg)
Pulse Rate
D.L. A.L. 12 24hr. 2 3 4 5 6 7 8 9 10 11 12 13 14da.

Figure 2

AVERAGE CURVE—ENTIRE GROUP

Averages of each of the readings above noted were calculated in the original unselected cases and graphs of these averages constructed. Due perhaps to the increased number of cases, a greater uniformity is to be found in the curves so made and, in general, the facts revealed by the smaller series are substantiated.

Danforth states that there is a rise of blood pressure coincident with labor. Schulze states that the average of eighty-six readings in the second stage of labor was found to be 133, and of 104 readings three hours postpartum 120. The present

series bears out these conclusions, though the average of 100 readings is found to be 131.6 instead of 133. Although no readings were taken three hours postpartum, a drop from 131.6 during labor to 126.6 immediately after labor and a further drop to 119.2 twelve hours after delivery indicate that the three-hour reading would practically coincide with Schulze's series. The systolic curve continues its downward trend to 108.9 six weeks after delivery, broken only by a slight rise of eight-tenths of a millimeter on the eleventh day postpartum.

The average diastolic pressure reveals the same steep decline as is noted in the systolic curve during the first twenty-four hours after delivery, falling from 81 during labor to 73.4 at the end of twenty-four hours. After the eleventh day it drops to 68 six weeks postpartum.

In the pulse pressure graph the same inclination to drop from the high level during labor to a more normal level is noted. This inclination to drop is much more gradual at first and more irregular from the ninth day to six weeks postpartum than shown in the systolic and diastolic graphs. The average reading during labor is 47.4, while at six weeks it is 41.2.

The pulse rate rises and falls as before, seemingly with no definite scheme. Here, however, may be noted a decrease in rate immediately following labor, and a more gradual decrease in the pulse rate level during labor, when it is 87.1, to six weeks postpartum, at which time it is 84.6.

FREQUENCY CURVES, ENTIRE GROUP

Systolic, diastolic, pulse pressure, and pulse rate in each of the 100 cases were plotted for each postpartum reading, and the curves of frequency of the four factors so constructed give further corroboration of the findings previously stated.

Systolic.—Systolic pressures (Fig. 3) range from 78 to 196. There were six patients with blood pressures of 160 or over who had albuminuria, edema, and other pre-eclamptic symptoms. The graph of these cases gives a quite different picture, showing a sharp decline immediately and twelve hours after labor, a secondary rise until the third or fourth day, followed by a gradual fall until the fourteenth day. Such also is the type of graph demonstrated by Dr. F. L. Adair in his work on hypertension. Schwartz shows similar curves in hypertension, but the time element differs somewhat from that of the present findings. The case in which a systolic blood pressure of 78 was

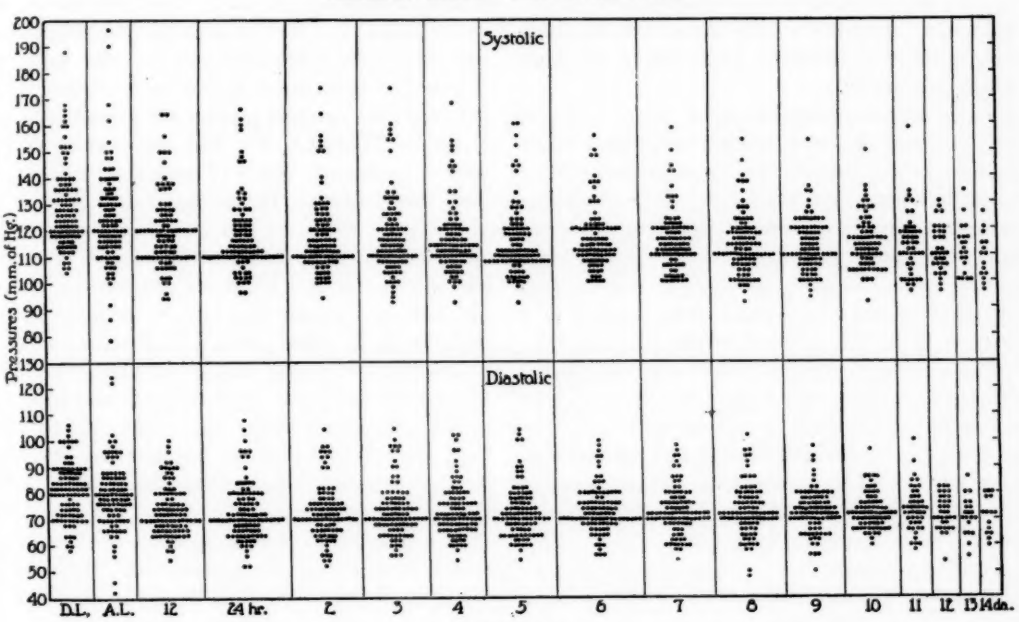

Figure 3

recorded is one in which a manual removal of the placenta was done, with a subsequent loss of 1,800 c.c. of blood. The patient was given 1,000 c.c. of normal saline solution intravenously, and the blood pressure began to rise. The range of from 104 to 168 during labor decreased to 96 to 126 at fourteen days. The most frequent pressure throughout all the readings is found to be 110, although during labor, immediately after, and twelve hours after labor 120 claims the majority.

Diastolic.—Diastolic pressures (Fig. 3) decrease from a frequent high level of 80 during and after labor to 70 twelve hours after delivery, which level finds the majority of readings throughout. The lower extreme drops from 58 to 42 immediately after delivery, but then increases to over 50, and only twice reaches 60. The upper extreme, however, exhibits a decline of from 108 to 80 at six weeks postpartum.

Pulse pressure.—In this curve (Fig. 4) it will be found that the lower extreme maintains a fairly uniform height, varying only from 24 during labor to 28 fourteen days afterward, while the upper extreme gradually decreases from 80 to 84 during and immediately after labor to 48 fourteen days postpartum. The modal pressure is seen to drop immediately and twelve hours after delivery to a level of 40, in the region of which it remains.

Pulse rate.—As has been noted previously in the pulse rate, it is not very dependable (Fig. 4). Its extremes vary from 60 to 130 during labor, drop to 60 and 65 to 120 immediately and twelve hours after labor, whereupon the lower extreme drops to 55 and the upper extreme rises to 128, just two points below its original height.

At fourteen days it is seen to be 65 to 110. The modal pulse rate drops from 90 during labor to 85 and 80 immediately and twelve hours after labor. It fluctuates between these two levels until the twelfth day, whereupon it rises to 90, only to return on the thirteenth day to its former level of 85.

During labor hemorrhage, anesthesia, and drug administration are the three factors which, together with decrease of intra-abdominal pressure, most influence blood pressure and pulse rate. An effort has been made to analyze any inter-relation between drug administration and hemorrhage and to demonstrate the effect of drug administration on the blood pressure and pulse rate. It may be noted here that practically every patient in this series was given nitrous oxide during the actual birth of the child and any effect that it may have had has been shown in the graphs already considered.

In the 100 cases under consideration, thirty-four patients were given drugs prior to or during labor. This group can be subdivided into (1) those patients who were given pituitrin, of whom there are twenty-four; (2) those who were given castor oil and quinine for the induction of labor, six in number, and (3) those who were given morphin and hyoscin, of whom there are five. These groups are of interest not only because of their variation from the general blood pressure curves, but also because of the possible effect of drug administration on the amount of hemorrhage.

In each case the amount of blood lost was measured roughly, and the amount absorbed by sponges and drapes estimated and added to the quantity measured. Throughout the series, including both the drug and non-drug groups, the average loss of blood was 247.44 c.c. For the cases in which drugs were administered, which of necessity include the truly abnormal cases, the average loss of blood was 416.17 c.c. When the two groups are separated, the non-drug group is found to have an average loss of blood of only 157.81 c.c., whereas the average amount of hemorrhage in the drug group is found to be, as stated above, 416.17 c.c.

Classification of the drug group shows that the five patients who were given morphin and hyoscin have the highest average blood loss, 479.16 c.c. This, perhaps, is due to the fact that one of these patients delivered an anencephalic monster and had an abnormal placenta. There was one case of persistent O.D.P. position in which the head was rotated manually and forceps applied. There were two cases of O.L.P. position, in one of which forceps were applied, and in the other a version and extraction performed.

Six patients were given castor oil and quinine. The average loss of blood in this group was 454.16 c.c. The unusual amount of hemorrhage and the high average is due to the fact that a manual removal of the placenta was done in a case in which pituitrin was given besides castor oil and quinine. The blood loss in this one case was 2,000 c.c. If this case were eliminated the average loss for this group would be 145 c.c.

In the remaining cases of the drug group, twenty-four in number, pituitrin was administered either to induce labor, or, in the second stage of

labor, to hasten delivery. Pituitrin was given nine times to induce labor in doses of three to four minims every half hour for five or six doses, or until the pains began; it was given fifteen times in doses varying from two to fifteen minims to hasten delivery. Consequently the average time prior to delivery was fifty-one minutes, whereas in most cases only fifteen to twenty minutes elapsed before delivery. The average amount of blood loss in this group was 356.24 c.c., but in this group there were two cases in which manual extraction of the placenta was done, carrying a loss of blood of 1,800 and 2,000 c.c.

Thus it is seen that those cases in which drugs were administered constitute a group which has an average blood loss much above that of the non-drug group. Graphs have been made of the average of the four factors during the first days after delivery.

PITUITRIN GROUP CURVE—AVERAGE

This group of cases in which pituitrin was administered numbers twenty-four. The average blood loss in this group is 356 c.c. or 200 c.c. more than that of the non-drug group.

PITUITRIN GROUP FREQUENCY CURVE

The curve of frequency in this group gives the same picture for systolic pressure and pulse rate, yet it shows that the lower range of diastolic pressure increases rather than decreases, and the modal pressure remains at practically the same level throughout the three days.

MORPHIN AND HYOSCIN CURVE

Even though the morphin and hyoscin group contains only five cases, its graphs illustrate quite well the unusual amount of hemorrhage and at the same time display the same general characteristics noted in the entire group of 100 cases. Systolic pressure reveals an excessive drop from 132.8 to 113.6 after delivery and a continued decrease through the third day. Diastolic pressure falls from 80 during labor to 69.6 twelve hours after delivery, but maintains this level through the two days following. Pulse pressure shows an initial fall from 52.8 during labor to 37.6 after labor, then rises for ten to twelve hours to 41.6, after which it resumes its downward tendency. The curve of pulse rate shows an initial drop and then an upward trend through the balance of the three days. This rise in the pulse rate is the natural result of hemorrhage.

FREQUENCY GRAPHS — GROUP OF 100 PATIENTS

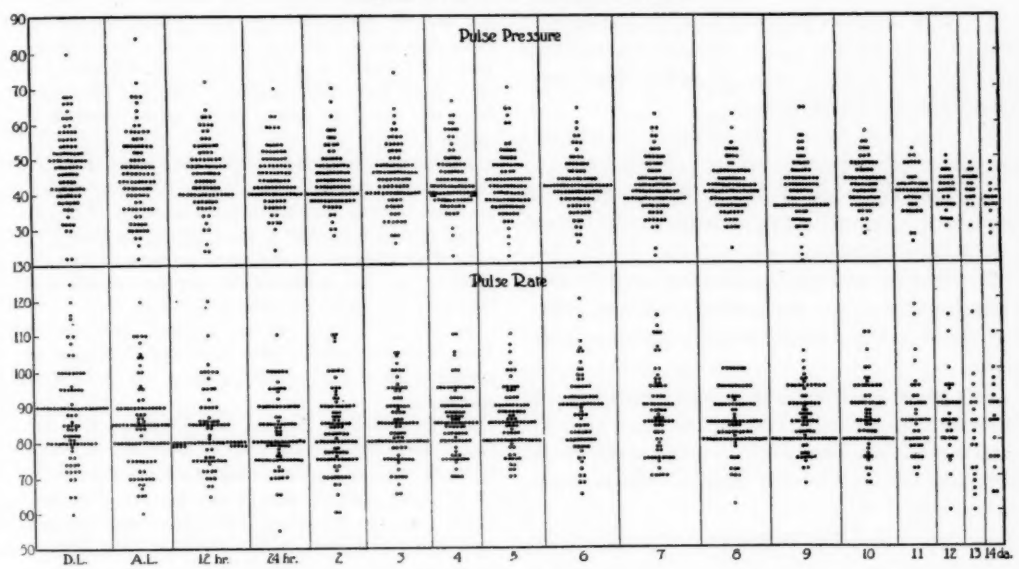

Figure 4

CONCLUSIONS

From the work presented it is concluded:

1. That there is an irregular but gradual rise in systolic, diastolic, and pulse pressures, and

pulse rate during pregnancy. This is true of both average and modal pressures.

2. That there is a sudden rise of pressures and pulse rate during labor, a marked decrease immediately after delivery, and a gradual decrease from that time until six weeks postpartum, when a normal pressure has been reached.

3. In pre-eclamptic toxemia the blood pressure shows a marked initial decrease after labor, a secondary rise with a subsequent slower and gradual return to its previous or more normal level.

4. That systolic blood pressure shows the greatest range of variability, diastolic the least, while pulse pressure and pulse rate fluctuate more or less but still coincide fairly well with the general tendency of the other factors.

5. That the average blood loss for 100 cases in this series is 247.4 c.c., but that this average falls to 157.8 c.c. if those cases in which drugs were administered are removed.

6. That those cases in which drugs are administered have an average blood loss of 416.2 c.c.

7. That drugs given in the therapeutic doses used in this series do not materially affect blood pressures or pulse rate.

8. That hemorrhage in obstetrical cases is more excessive when drugs are used and is a very important factor in influencing blood pressures and pulse rate.

This paper is the result of a suggestion from, and interest stimulated by, Dr. F. L. Adair, and the routine work has been done by the authors in the Maternity of the Swedish Hospital, Minneapolis, Minnesota.

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DISCUSSION

DR. ADAIR: The way the blood loss was determined in these cases was as follows:

As soon as the child was delivered, a basin was placed against the perineum and all the blood lost was collected in this basin and measured. So far as the blood loss is concerned, I think that was fairly accurate.

In the manual removal of the placenta—one losing 1800 c.c. and the other 2000 c.c.—this includes the amount of blood lost up to the time the placenta was removed. I realize that this is a tremendous amount of blood. I think in both instances the hemorrhage with the third stage of labor was one of the causes for the manual removal of the placenta.

I think the management of the third stage is fairly uniform in the hospital. Essentially, the same technic is used, i. e., merely the expectant management of this stage.

The interesting things to me in the series are—

1. The tendency of the blood pressure to rise during pregnancy so that it attains not only the average pressure but the curve shows an upward tendency.

2. The rather abrupt rise of blood pressure during labor, with a subsequent drop and gradual decline until a normal or usual level is reached about the end of the second week.

3. The difference between the behavior of a normal case without hypertension and the case with hypertension. In cases without any abnormal blood pressure, both the systolic and diastolic drop uniformly, but show no secondary rise. In the others, with hypertension we get the same rise during labor, with a subsequent fall, then a secondary rise and a secondary fall.

I am not certain that the use of drugs should be taken as the reason for the large amount of blood loss in these cases. Many of these cases were cases of prolonged labor, cases which had gone overtime, etc. Various factors enter into this loss, so I hardly think it is fair to attribute the greater blood loss solely to the administration of drugs.

DR. SWEETSER: How high was the highest systolic pressure?

DR. ADAIR: 196.

DR. SIMONS: I might add that in one of the cases in which manual extraction of the placenta was done, the extraction was done for hemorrhage. The woman went into shock; her systolic dropped to 78 and the diastolic to 46. She was given intravenous injections of saline. In the other case pressure was exerted, expression was done, and eversion of the uterus resulted. These are the two cases in which blood loss was greatest.

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VOL. VIII MAY, 1925 No. 5

EDITORIAL

Mercurochrome, Gentian Violet, and Hexyl-Resorcinol as Antiseptics

Widespread, exaggerated statements of the value of recent antiseptic compounds have appeared in the daily newspapers throughout the country. As a result of this unfortunate notoriety, not only the public, but apparently the medical profession as well, have been led to believe that the cure for sepsis has finally been discovered. Unfortunately, this much desired goal has not as yet been reached. As a result of this publicity and the enthusiastic case reports in medical journals, physicians otherwise conservative and well balanced are using a considerable assortment of antiseptic solutions intravenously for a variety of diseases. This is particularly applicable to the intravenous use of mercurochrome.

Although the Council on Pharmacology officially recognizes the value of mercurochrome as a local germicide, it has not as yet made any statement with regard to its efficacy when used intravenously or internally. It has not even been determined whether its effect is specific as an antiseptic, or indirect as the result of protein reaction. In the meantime, many physicians have blindly used this powerful antiseptic solution intravenously without any scientific guidance or precautions. Exaggerated statements have been circulated as to the wonderful recoveries that result from its use. The rather overwhelming number of failures, the violent reactions, the ill results and the occasional fatalities are not so well known. Severe reactions are frequently observed after the intravenous use of mercurochrome, marked by prostration, chills and dysentery. Hench, Snell and Greene in the Mayo Clinic have noted definite acidosis in several cases. Several deaths have followed its use, and probably more have occurred that are not reported.

Clinical experience has proved that mercurochrome administered intravenously is of the greatest value in acute and subacute infections of the urinary tract. Since this type of infection, however, usually responds to the ordinary medication, intravenous chemotherapy should be reserved for such cases as do not respond. Recovery has been observed in a few forms of acute disease of the skin following the intravenous injection of mercurochrome, but its exact value remains questionable. In chronic general infections, such as arthritis, pelvic infections, and so forth, it is rarely of much value. In fact, in most general infections involving the various portions of the body, its use has been disappointing. Only in the occasional case of acute general sepsis has it achieved good results. It is true that in these occasional cases recovery is sometimes miraculous, but the number of such is so small, and the attendant danger so great, that the method should be employed only as a last resort.

The intravenous use of gentian violet has been advanced for infections when a staphylococcus is found in the blood cultures. The reactions following its use are comparatively slight, so that it may be employed with less risk than mercurochrome. The results, however, have been similarly limited. In septic endocarditis, which should afford particularly favorable conditions for its use, it has been most disappointing. Staphylococcus cellulitis is hindered only occasionally. In a few cases of general sepsis, caused by staphylococcus, brilliant results have been attained.

Hexyl-resorcinol, a more recent germicide, has similarly experienced unfortunate newspaper notoriety. Sincere efforts were made to prevent any

general use of this drug until it was fully tested. In spite of this, it was hailed in the press as a miraculous care for all forms of urinary infection. Those who have used it are much more conservative in their expressions. In some few cases of chronic staphylococcus infection it has proved to be useful in conjunction with other measures. However, it has not succeeded in supplanting, to any great degree, the more standardized methods.

Chemotherapy, and particularly the intravenous, would seem to have a promising future. Our present products are comparatively crude, but our methods will undoubtedly be improved. Until they are, it behooves the conservative physician to employ chemotherapy only in selected cases, and to safeguard the administration with every precaution.

W. F. BRAASCH.

The Legislative Committee

Some of our profession hold that our organization should adopt an attitude of "laissez faire" regarding legislation affecting public health. They say, "Let the public have what they want and if they do not know what is good for them let them suffer."

Others believe that in a government of, for and by the people, each component element of society has a certain duty to perform by helping to direct legislation. Our legislators are not men professionally trained in legislation but are for the most part practical, honest and reasonable men drawn from various walks of life. In case of doubt as to the advisability of a proposed measure they are most likely to vote "no." This is as it should be and radical departure from established precedent is least likely. The legislator, therefore, has to be instructed by those interested and best informed before he can intelligently pass on proposed measures.

The experience of our state legislative committee has been quite unique for Minnesota at least. A bill sponsored by the physicians of the state has been enacted. The statute of limitations for malpractice cases has been reduced from six to two years. The committee found that it was simply a question of convincing the legislators of the justice of the bill and that personal contact was absolutely essential. Some call such methods lobbying and think it undignified. There is no reason why personal persuasion in the form of lobbying need be objectionable.

Most of the energy of the committee was exerted in blocking proposed medical bills which were ill-advised to say the least. One bill, which fortunately was not acted upon by this legislature, provided in brief that any city hospital patient might choose his medical attendant irrespective of school or cult; at first thought a very reasonable provision for a citizen of a free country. It is interesting to speculate how such a measure would have affected hospital administration. A staff would lose its identity as such. A diphtheria patient might well ask to have a chiropractor manipulate his spine to correct the impingement causing the sore throat. Or one with an abscessed appendix might elect absent treatment by a Christian Scientist. Just as reasonable in hospital as out of hospital. Perhaps the best argument against such a bill is that city hospitals in Minnesota having staffs so composed would lose their standing in the list approved for internship by the medical colleges and state boards and would thus be able to get no internes from the best medical schools and perhaps none at all. The bill made little progress.

Among other unwise bills blocked at the recent legislature were the following:

A bill authorizing nurses receiving their training in hospitals for the insane to practice psychiatric and general nursing after examination by the Board of Control. The word "general" killed the proposition.

A bill to prevent full time employes of the State University or other State institutions from engaging in any outside activities under penalty of fine and dismissal.

A bill to prevent the building of any contageous hospital within fifteen hundred feet of any public park.

A bill authorizing the appointment of a Board of Examiners for Naturopaths.

A chiropractic bill lowering the requirements for the practice of chiropractic in the State. The chiropractors killed this bill themselves.

Anti-vivisection and anti-vaccination bills. The one track minds which compose these antis are most persistent.

For some time the masseurs have been endeavoring to obtain a Board of Examiners. A bill provid-

ing for the creation of such a Board is at present writing before the legislature. There seems to be no good reason why such a board should not be created.

The State Association has been most fortunate in having a legislative committee this year which obtained results. This was particularly due to the activities of Dr. H. M. Johnson, of Dawson, who gave unsparingly of his time and energy and is particularly gifted for work of this sort. The Association would be most fortunate if it should be able to retain his services indefinitely. Just as important medical legislation is likely to arise in the next legislature and we as a profession must prepare to meet it.

COMMUNICATIONS

Duluth, Minnesota, April 11, 1925.

HYPERTHYROIDISM IN NORTHERN MINNESOTA

What is to be the ultimate influence of the indiscriminate use of iodin, so largely taken now by many people, either in the form of Nu-Salt, Lugol's solution, iodin tablets, or, even more definitely, from the drinking of public water supplies to which iodin has been added?

This is becoming more than an academic question, in view of the rather striking number of people who have presented themselves, especially in the last two months, with outspoken signs of thyroid toxicity.

The first impulse is to call this goiter toxicity, but many of these patients seen have had no apparent goiter, and in many instances the thyroid can scarcely be felt.

Nevertheless, the train of symptoms, including weight loss, tremor, nervousness, tachycardia, skin flushing, have all been so outspoken as to incriminate the thyroid at once.

These patients are showing basal metabolic readings of +50, and often as high as +85.

The region of Virginia and Gilbert, Minn., where the public water supply is treated with iodin, has contributed enough of these patients so that it can be scarcely said any longer to be mere chance. These patients are coming from other regions, but in practically every one it will be found that they had been using iodized salt for some time. A number of them present the story of recent infections—but, we have these infections every winter, of exactly the same sort, and yet, this is the first time that this thyroid toxicity picture has presented itself so vividly and in such numbers.

This is written in the hope that others will express themselves on this subject. Are we sure that some people may not be disturbed by even the small amount of iodin taken in the manner here indicated? Granted that the natural supply of water along the seacoast has as much iodin as is artificially introduced into some of our supplies, does it follow that both will act the same or that a people in an iodin-low locality (long residents) can be arbitrarily grouped without bringing into the foreground some notably susceptible individuals?

E. L. Tuohy.

OBITUARY

DR. EDWARD EVERETT HOIT

Dr. Edward Everett Hoit, a pioneer physician of Detroit, Minnesota, died at his home Saturday, April 4, 1925, following an apoplectic stroke, which he had suffered three weeks previously.

Edward Everett Hoit was born at Auburn, Maine, September 3, 1852, the son of James Russell Hoit and Abbie Rea Hoit. The family moved to Minneapolis in 1869. He entered Ann Arbor, Mich., Medical College, where he graduated in 1878, after which he began the practice of medicine in Minneapolis, and came to Detroit, where he permanently located in the summer of 1880. Soon after this he took a course of lectures at Belleview Medical College, New York, and later, still pursuing his studies, entered Rush Medical College, Chicago, where he graduated in 1885.

October 24, 1889, he married Della B. Day, of Detroit. One daughter, Lucille, now Mrs. J. K. McCarthy, was born to them. Mrs. Hoit, her mother Mrs. Day, Mr. and Mrs. McCarthy and one granddaughter, Corice McCarthy, are the sole survivors of the family, the doctor's only brother having recently died in Minneapolis.

For many years Dr. Hoit served as county physician. He was a member of the Odd Fellows Lodge, also of the lodges of Yeomen and the Red Men.

The esteem in which Dr. Hoit was held in his own community is well portrayed in the following excerpt taken from a home paper:

"Dr. Edward Everett Hoit came to Detroit in the summer of 1880—forty-five years ago—and during all of the intervening years he devoted his life to the promotion of the health and happiness of the people among whom he lived. A most worthy purpose—a course that may be said to have been well run, and finished beyond the allotted time of threescore years and ten.

As a physician and surgeon Dr. Hoit earned and won more than a local reputation as a successful practitioner. He enjoyed the confidence and the friendship of those whom he served in time of need. Coming here a young man just recently graduated and prepared for his life work, for nearly half a century he has carried on, and now at the age of seventy-three years he has passed to his reward.

Dr. Hoit will be greatly missed in this community, for his ready smile of greeting, his always apt and ready story, his cheerful outlook upon life's duties were recognized and won for him many lasting friendships."

DR. CHARLES CLIFFORD MAY

News of the death of Dr. Charles Clifford May of Adrian, which occurred March 15, 1925, as the result of a self-inflicted bullet wound, came as a shock to members of the community in which Dr. May lived and to members of his profession.

According to the report of his death published in an Adrian paper "Dr. May had an active mind, was a deep

thinker, and well read on the topics of the day. He always took a great interest in our schools and a number of years ago was a member of the school board. He was an active member of the local Masonic Chapter and the Masonic Chapter at Worthington.

"He was highly respected by all and his manner of passing is deeply regretted by the entire community."

Charles Clifford May was born at LeClaire, Iowa, on March 8, 1860. About the year 1886 he came to Adrian, where he began his profession, and where for the past thirty-nine years he had been one of the prominent physicians. In the year 1891 he was married to Miss Carrie Johnson, then a teacher in the Adrian public schools. He was a graduate of the University of Iowa, the New York Polyclinic of New York City, and the Chicago Polyclinic at Chicago. He was also a member of the Southwestern Minnesota Medical Association, the Minnesota State Medical Association and the American Medical Association.

The deceased is survived by his wife and three children. The children are Darwin R., of Indianapolis, Ind.; Mrs. C. M. Anderson (Lillian), of Estherville, Iowa, and James A., of Minneapolis.

DR. GEORGE H. GREEN

Dr. George H. Green, of Spokane, Washington, was killed recently in an automobile accident. He suffered a fractured skull when the automobile in which he was riding was hit by a speeding car at a street intersection.

Dr. Green spent his boyhood in St. Peter, Minnesota, and graduated in medicine at the University of Minnesota in 1904. He first located at Reardon, Washington, where he practiced until about two years ago. Going East, he took postgraduate study in surgery and had been associated the past year with Dr. D. C. Hewitt in Spokane.

Dr. Green is survived by his mother, Mrs. Charlotte Green, now of Los Angeles, three brothers and a sister.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

Officers: President, Dr. H. W. Meyerding, Rochester; First Vice-President, Dr. F. R. Huxley, Faribault; Second Vice-President, Dr. J. S. Holbrook, Mankato; Secretary-Treasurer, Dr. H. T. McGuigan, Red Wing; Chairman of Program Committee, Dr. Waltman Walters, Rochester.

The annual meeting of the S. M. M. A. will be a one-day meeting, May 18th, at Owatonna. Scientific presentations will be given morning, afternoon and evening. The presidential address by Dr. H. W. Meyerding of Rochester on the history of the Association will be given at the evening meeting. The following program has been arranged:

MORNING SESSION

I. "Use of Radium Seeds in Malignant Tumors of the Head and Neck," Dr. F. A. Figi, Rochester.

II. Symposium on Abdominal Diseases

1. "Consideration of Diagnosis of Chronic Abdominal Disease," Dr. D. M. Berkman, Rochester.
2. "Clinical Diagnosis and Treatment of Diseases of the Gall Bladder," Dr. Wm. Carroll, St. Paul.
3. "The *X*-ray Diagnosis of Gall Bladder Lesions," Dr. C. G. Sutherland, Rochester.
4. "A Mistaken Diagnosis of Appendicitis," Dr. B. J. Gallagher, Waseca. Discussion, Dr. J. F. Smersh, Owatonna.
5. "Perforated Gastric and Duodenal Ulcers," Dr. J. S. Holbrook, Mankato.
6. "Arteriomesenterial Ileus," Dr. E. M. McLaughlin, Winona.

III. "Abdominal Injuries and Their Treatment," Dr. Karl Meyers, Chief Surgeon, Cook County Hospital, Chicago.

IV. "Heart Pains—Various Types and Clinical Differentiation," Dr. C. N. Hensel, St. Paul. Discussion, Dr. F. A. Willius, Rochester.

V. "The Management of Cases of Colloid Goiter," Dr. H. C. Habein, Rochester. Discussion, Dr. W. A. Plummer, Rochester.

VI. "Pathological Findings in 200 Cases of Primary Hypertension," Dr. E. T. Bell, Professor of Pathology, University of Minnesota, Minneapolis.

Luncheon

AFTERNOON SESSION

I. Symposium of Confinement and the New-Born

1. "Hemorrhagic Diseases of the New-Born with Importance of Bleeding and Coagulation Time," Dr. Margaret Warwick, Assistant Professor of Pathology, University of Minnesota, Minneapolis. Discussion, Dr. Roger Kennedy, Rochester, and Dr. O. Grob, Rochester.
2. "Observations on Dry Labor," Dr. L. M. Randall, Rochester. Discussion, Dr. L. W. Barry, Assistant Professor, Obstetrics and Gynecology, University of Minnesota, St. Paul.
3. "Abruptio Placentæ," Dr. J. A. Cosgriff, Mankato. Discussion, Dr. Roy Andrews, Mankato.

II. "Urinary Antisepsis—the Present Status of the Problem," Dr. Edwin Davis, Professor of Urology, University of Nebraska, Omaha. Discussion, Dr. G. J. Thomas, Minneapolis; Dr. F. E. B. Foley, St. Paul; Dr. J. L. Crenshaw, Rochester.

III. "Recent Advances in the Treatment of Syphilis," Dr. W. H. Goeckerman, Rochester. Discussion, Dr. H. Irvine, Minneapolis.

IV. "Traumatic Injuries of the Hand," Dr. C. W. Hopkins, Chief Surgeon, Chicago & Northwestern Ry. Co., Chicago.

V. "Treatment of Empyema from Its Onset," Dr. S. W. Harrington, Rochester.

EVENING SESSION

BUSINESS MEETING—BANQUET

I. Presidential Address, Dr. H. W. Meyerding, Rochester.

II. Subject to be chosen—Hon. W. I. Nolan, Lieutenant Governor of Minnesota.

III. Dr. D. C. Balfour, Professor of Surgery, Mayo Foundation, Rochester.

Moving Pictures at Evening Session.

1. "Pathology and Treatment of Pulmonary Tuberculosis," Dr. Cole's film loaned through the kindness of Dr. Longstreet Taylor, St. Paul.
2. "The Mechanism of Swallowing in Cardio-Spasm," Dr. P. P. Vinson, Rochester.

LYMANHURST STAFF MEETING

The regular meeting of the medical staff of the Lymanhurst School for Tuberculous Children will be held in the Lymanhurst School, 1800 Chicago Avenue, Minneapolis, Tuesday evening, April 21, at 7 o'clock.

The following program will be given:

"*Tuberculous Empyema,*" Dr. Willis S. Lemon, Mayo Clinic, Rochester, Minnesota.

Fourth Annual Report of Lymanhurst:

Short addresses by:

Dr. E. P. Lyon, Dean of Medical School, University of Minnesota.

Dr. S. Marx White, Chief of Department of Medicine, University of Minnesota.

Dr. C. M. Jackson, Dean of Graduate School, University of Minnesota.

All persons interested in tuberculosis are invited to attend these meetings and participate in the discussions.

AMERICAN PROCTOLOGIC SOCIETY

The American Proctologic Society will hold its annual meeting at the Ambassador Hotel, Atlantic City, May 25 and 26, 1925, at the time of the American Medical Association meeting. The program includes a paper on Sacral Anesthesia by Dr. L. A. Buie, Rochester, Minn., and one on the Probable Relation of Ano-rectal Fistulæ to Tuberculosis by Dr. W. A. Fansler, Minneapolis.

Those interested in this field of medicine are invited to attend the meeting of the society.

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

The Southwestern Minnesota Medical Society will hold its next meeting at Windom, Minnesota, May 21, 1925. Dr. E. M. Hammes, St. Paul, and Dr. H. M. Johnson, Dawson, will be among the speakers appearing on the program.

OF GENERAL INTEREST

Dr. Morris H. Natharson is now associated with Dr. Moses Barron in the practice of internal medicine at 309 Physicians and Surgeons Bldg., Minneapolis, Minn.

The South Dakota State Medical Association will hold its next annual meeting at the Cataract Hotel, Sioux Falls, South Dakota, Wednesday and Thursday, May 20 and 21, 1925.

Dr. W. E. H. Morse has disposed of his practice at Morristown and is now located at Altura, Minnesota, where he will continue the practice of his profession and will conduct a drug store.

Dr. A. C. Strachauer, chief of the Department of Surgery at the University of Minnesota, has resigned that position to become director of the new George Chase Christian Cancer Institute at the University.

The resignations of Dr. F. W. Wittich, assistant professor of Medicine, and Dr. C. M. Cleveland, teaching fellow in obstetrics, and Dr. C. H. Osborne, teaching fellow in anatomy, have been accepted by the school.

Nineteen women entered the School of Nursing at the University of Minnesota, at the beginning of the new quarter in April, and are enrolled in both the five year and three year courses. Only one student graduated from the school at the end of the last quarter.

The next examination conducted by the American Board of Otolaryngology will be held at the Ambassador Hotel, Atlantic City, on Tuesday, May 26, 1925, at 9 A. M. Application blanks may be obtained from Dr. H. W. Loeb, secretary, 1402 South Grand Boulevard, St. Louis, Missouri.

If present plans mature, approximately 1,000 University of Minnesota seniors will receive diplomas in June at the first open air commencement exercises ever held at the institution. The regents acted favorably on a report of the functions committee recommending that commencement exercises be held in the new Memorial Stadium.

Minnesota will follow the example of other institutions by issuing two kinds of tickets, one for the Stadium, of which an unlimited number can be issued, and one admitting to the Armory, to which the exercises will be moved in case of rain. Parents and immediate relatives will be given the preference in distribution of the Armory tickets.

The Minnesota State Conference of Social Work will hold its annual session September 19 to 25, 1925, at the State College of Agriculture, St. Anthony Park, St. Paul. The Institute will be held in connection with the Conference. Speakers of national reputation will receive special emphasis. All individuals interested or engaged in social work are invited to attend the meeting.

The University of Minnesota has obtained a conditional gift of $1,250,000.00 from the General Education Fund of the Rockefeller Foundation for the development of the Medical School. The University must raise an additional

sum of $2,350,000.00 in order to take advantage of this gift. In considering ways and means of raising this rather large sum, permission was obtained to apply the cost of a new Minneapolis City Hospital to the additional amount to be raised. A free site for the proposed new city hospital has been offered the city of Minneapolis but the Mayor's committee has voted against the proposition, mainly on the grounds of the prohibitive cost of a new institution. Minneapolis has at present a large general hospital which would have to be duplicated under the proposed plan. The committee has recommended the purchase of the Judd block for $275,000.00 for future expansion of the present hospital.

THE A. M. A. LIST OF APPROVED HOSPITALS

The American Medical Association, through its Council on Medical Education and Hospitals, which handles the hospital work for the Association, has issued its 1925 revised list of Hospitals Approved for Internships. The list is published in The Journal of the American Medical Association for March 28. It will also appear in the Ninth Edition of the American Medical Directory, besides being in separate pamphlet form. The list names 524 hospitals that are in position to furnish general internships, such as satisfy the medical colleges and state boards as well as meet the almost universal demand of medical graduates for at least a year's general hospital experience, practice or specialization.

There were reported 5,059 interns of whom 3,825 are in the 524 approved hospitals, and 1,234 interns in 2,696 non-approved hospitals. This total of 5,059 interns compares favorably with the 3,669 interns reported in the census of one year ago, the increase being 1,390, or 37.9 per cent. In fact, there are 156 more interns now in approved hospitals than there were in all hospitals two years ago.

When the hospitals began to feel the shortage of interns about a decade ago, they quite naturally resorted to pecuniary appeals and offered salaries, usually ranging from $25 to $100 per month and maintenance. Now the appeal must be made on the basis of educational opportunities offered, rather than financial remuneration. There are still a number of hospitals that pay their interns,—and there can be no objection to giving interns some financial help, but hospitals which secure the best interns and most easily are those whose staffs are known to furnish the best educational opportunities, salary or no salary. The Council on Medical Education and Hospitals also publishes a list of the hospitals that provide approved residencies in specialties for those who have already had a general internship or experience.

By furnishing these lists the Council serves not only those who are seeking an internship or residency, it also contributes much to the good of the profession and the public by encouraging a broad general foundation, both for general practice and for specialization.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

ABBOTT LABORATORIES:
Butesin Picrate Dusting Powder

ELI LILLY AND CO.:
Iletin (Insulin-Lilly) U-80, 10 c.c.

H. K. MULFORD CO.:
Rabies Vaccine (Phenol Killed)-Mulford

PARKE, DAVIS AND CO.:
Desiccated Parathyroid Gland-P., D. and Co.
Cauliflower Protein Extract Diagnostic-P., D. and Co.
Lentil Protein Extract Diagnostic-P., D. and Co.
Friedlander Bacillus Protein Extract Diagnostic-P., D. and Co.
Micrococcus Tetragenus Protein Extract Diagnostic-P., D. and Co.
Streptococcus Hemolytic Protein Extract Diagnostic-P., D. and Co.
Streptococcus Non-Hemolytic Protein Extract Diagnostic-P., D. and Co.
Parathyroid A Protein Extract Diagnostic-P., D. and Co.
Parathyroid B Protein Extract Diagnostic-P., D. and Co.
Pine Pollen Protein Extract Diagnostic-P., D. and Co.
Apricot Protein Extract Diagnostic-P., D. and Co.
Yellow Daisy Pollen Protein Diagnostic-P., D. and Co.
Ox-Eye Daisy Pollen Protein Diagnostic-P., D. and Co.
Oak Pollen Protein Extracts Diagnostic-P., D. and Co.

E. R. SQUIBB AND SONS:
Insulin-Squibb, 40 Units, 5 c.c.
Bean (Kidney) Allergens-Squibb
Cauliflower Allergens-Squibb
Frog's Legs Allergens-Squibb
Daisy Pollen Allergens-Squibb
Bacillus Acne Allergens-Squibb
Bacillus Friedlander Allergens-Squibb

SWAN-MYERS CO.:
Timothy Pollen Extract-Swan-Myers

Tuberculin Intracutaneous (Human Type).—A preparation of tuberculin-Koch (New and Non-official Remedies, 1924, p. 309) marketed in single packages of one intradermal syringe containing 0.00005 c.c. of tuberculin old "O. T."; in packages of five intradermal syringes each containing 0.00005 c.c. of tuberculin old "O. T." and in single vial packages containing tuberculin old "O. T." sufficient for fifty tests. H. K. Mulford Co., Philadelphia.

Squibb's Liquid Petrolatum with Agar.—A mixture composed of liquid petrolatum-Squibb—heavy (California) 50 c.c.; agar 1.5 Gm.; sodium benzoate, 0.1 Gm.; acacia, glycerin and water sufficient to make 100 c.c. Squibb's liquid petrolatum with agar has the action of liquid petrolatum. It is claimed that the agar by adding bland bulk to the bowel contents, stimulates peristalsis in a normal way and that the combination of liquid petrolatum with agar mixes readily with the feces and softens them. E. R. Squibb and Sons, New York.

Mercurosal Ampules 0.1 Gm.—Each ampule contains mer-

curosal (New and Non-official Remedies, 1924, p. 207) 0.1 Gm. in 5 c.c. of distilled water containing 0.1 per cent of sodium citrate. Parke, Davis and Co., Detroit. (Jour. A. M. A., Mar. 7, 1925, p. 751.)

Tryparsamide. — Sodium N-phenylglycinamide-p-arsonate. Tryparsamide contains 24.6 per cent of arsenic in organic combination. Tryparsamide is primarily a trypanocidal agent and is proposed for use in the treatment of certain forms of trypanosomiasis. Tryparsamide has some spirocheticidal activity and has an unusual power of therapeutic penetration, especially in the case of the central nervous system. This has led to its trial in certain cases of cerebrospinal syphilis. The value of the drug in these conditions, as compared with other methods of treatment, has not been conclusively determined. Tabetic affections have responded less satisfactorily, and patients with general paresis with advanced physical and mental deterioration have shown little or no improvement and the drug may hasten the progress of the disease in such cases. Its use is considered to be contraindicated in forms of syphilis other than that of the central nervous system. The worst of the properties of the drug is a tendency to produce amblyopia. Before using the drug, consideration should be given to the frequent production of visual injury. Tryparsamide may be administered subcutaneously, intramuscularly or intravenously. Powers-Weightman-Rosengarten Co., Philadelphia. Jour. A. M. A., Mar. 14, 1925, p. 815.)

Insulin-Squibb 40 Units.—5 c.c. vials containing 40 units of insulin-Squibb (The Journal, A. M. A., Nov. 8, 1924, p. 1509) in each c.c. E. R. Squibb and Sons, New York.

Rabies Vaccine (Phenol Killed)-Mulford.—The virus is prepared according to the general method of David Semple. It consists of a sterile suspension of the brain tissue of rabbits moribund from the injection of virulent fixed strain of rabies. The virus is killed by the use of phenol and by incubation at 37.5 C. for twenty-four hours. Marketed in packages of 14 doses, each dose contained in a syringe. All the doses are of the same potency. H. K. Mulford Co., Philadelphia. (Jour. A. M. A., Mar. 21, 1925, p. 893.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 11, 1925

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 11, 1925, at 8 p. m. The meeting was called to order by the President, Dr. H. P. Ritchie. There were 34 members present.

The minutes of the February meeting were read and approved.

Dr. S. E. Sweitzer (Minneapolis) reported two cases and showed lantern slides.

1. Hypernephroma of scalp. T. W., age 50, male, white. Patient presents himself with pain in his right hip region of duration of four months. Multiple tumors, firm, involving the skin only, not being attached to the bony tissues beneath. Tumors present on scalp, back, chest, and abdomen. Duration of thirteen months. On October 17, 1912, patient had right kidney removed by Dr. Will Mayo. Diagnosis: Hypernephroma.

On September 16, 1924, patient shows metastases to the left humerus, confirmed by *x*-ray. Amputation near the shoulder was performed September 22, by Dr. Eitel.

Biopsy of scalp tumor—Hypernephroma structure on section "microscopic." Laboratory findings: Urine, negative. Blood counts normal. Wassermann, negative.

2. Serpiginous syphilid. C. G., age 62, male, white. Presents himself with the following complaints: orthopnea, duration six weeks; cough, duration six weeks; pain in lower chest on both sides; large inguinal hernia, duration forty years; urinary frequency, urgency, and nocturia of several years' duration. Skin lesions on legs, arms and scattered about on trunk of body. The lesions present the picture of serpiginous syphilids.

Patient denies history of infection. States he has never had any primary lesion of syphilis. Patient has never had any anti-luetic treatment.

Laboratory findings: Wassermann was negative on one occasion. Salvarsan was given intravenously. A Wassermann was taken four days later and a four plus (cholesterin, alcoholic antigen) Wassermann was secured.

Dr. A. N. Collins (Duluth) reported the following case: I wish to present the report of a case of thromboangiitis-obliterans which came under my observation. A young Russian, 35 years of age, not of Jewish descent. When I first saw him, about six months ago, he had gangrene of the small toe of the right foot. No pulse could be felt in the foot. Urine and blood chemistry were negative for sugar. *X*-ray of the foot was negative for blood vessels but showed some atrophy in the peripheral bones of the foot. Many Wassermanns were all negative. The pathology of this condition is a deposit in the wall of the blood vessels—the main vessels rather than the small arteries. The gradual increase of this deposit in the walls closes the lumen and starvation of the extremity results in gangrene.

The patient first had an amputation just above the ankle, against my advice. I thought it should be higher, but he would accede to it only above the ankle; but finally, several months later, we amputated above the right knee. Dr. Gordon MacRae immediately took the amputated part, washed out and injected the circulation with a carefully prepared barium mixture. (Photograph shown.) This is a print of one of the stereo films taken. You will see the ragged narrowing in various places along the main artery from the popliteal space down to the extreme end of the amputated tibia. The arterial branches do not seem to be involved.

Dr. Gustav Schwyzer (Minneapolis) presented the following case:

The tumor which I am showing you here is the right kidney of a man 63 years old. The history states that the man had a little blood in his urine from time to time but suffered no pain or discomfort. About a year ago a physician was called on account of retention of urine. At that time there was no blood by the catheterization. The prostate was found enlarged. The hematuria became more frequent of late and the patient sought medical help. The

diagnosis of nephroma of the right kidney was made by Dr. Owre, who cystoscoped and made a pyelogram. My part in the case was to perform the removal of the tumor. This act proved to be very difficult on account of the fixation of the tumor onto the diaphragm. The patient made a speedy recovery though, and is ready to leave the hospital.

DISCUSSION

DR. OWRE: I was called in consultation, to cystoscope this case for Dr. Nordland, for the purpose of ascertaining the possibility of a growth in the bladder. The patient had an enlarged prostate and gave the history of blood in the urine on several occasions during the past four years. Dr. Nordland stated that the patient had called a physician to his home to relieve him of retention of urine.

Upon cystoscopic examination, the bladder was found to be trabeculated, the prostate enlarged, but the mucosa showed no evidence of inflammation or tumor. There was about 4 ounces of bloody residual urine. Blood could be seen spurting from the right ureteral meatus.

The *x*-ray showed no evidence of stone. A pyelogram showed the pelvis of the kidney to be entirely distorted, with no normal calices; a typical pyelogram of nephroma. (The specimen removed by Dr. Schwyzer is before you.)

He gave no history of ever having had pain in his back and the prostate, on rectal palpation, showed a soft adenoma, the lobes of which could be seen projecting into the bladder.

The point I wish to emphasize is that this shows the justification for cystoscopic examination in cases of enlarged prostate. I could detail several striking cases with unusual pathological findings which would have been overlooked, had we not made a cystoscopic examination.

DR. H. A. H. BOUMAN (Minneapolis) then read his inaugural Thesis, entitled "Fibroplastic Typhlitis and Appendicitis."

DISCUSSION

DR. A. SCHWYZER: The Academy is to be congratulated on hearing this interesting subject discussed so carefully by Dr. Bouman. It is of value to the surgeon especially. The fact that we have at times in inflammatory conditions, outside of acute perforation, an intense overgrowth of connective tissue, occurs in a great many places in the abdomen. The Doctor has mentioned hypertrophic ulcer of the stomach. Among a number of such cases one was a woman who, 20 years ago, was operated on and a very large ulcer was found at the pylorus. Nine months afterwards she was again operated on and a gastroenterostomy was done. She was quite well for years then. About 7 years afterwards I saw her. She was again vomiting practically everything, and an *x*-ray picture showed that this mass, which had apparently been as large as a man's fist, had dwindled away. A small streak of barium was indicating the pyloric antrum. The gastroenterostomy was almost closed. We could see now a new ulcer that was far up on the lesser curvature. We again operated and found the gastroenterostomy closed down to an opening in the mucosa of the size not more than a quill. We made a new gastroenterostomy in the same place as before and she is living today—20 years after the first operation when the case had been declared to be carcinoma of the pylorus.

Within two weeks I saw three cases of diverticula of the colon. They presented the three main conditions that will occur in these cases. One was combined with carcinoma of the colon. Another was giving practically no symptoms and was a case where we operated for gallstones. The third was a fibroplastic condition. She had subacute appendicitis and when we operated on the appendix we made use of the opportunity of examining the sigmoid with the finger. There was an apparently inflammatory mass the size of a duck egg. The *x*-ray showed diverticula. Now after seven weeks I saw her again and gave her gas to examine how the condition was, and the mass is hardly to be felt; it is surely much smaller. All the treatment she had was regular doses of mineral oil.

In one of the cases of mine which the Doctor mentioned in his paper, the tumor was as large as an orange. On sectioning through the tumor, it was a very interesting picture. Hard fibrous concentrical layers were seen, and in the center of this mass were the remnants of a gangrenous appendix and a little pus. The mass was nearly double the size of a man's fist.

The condition is a very important one to keep in mind.

DR. ZIMMERMAN: Fibroplastic exudates as described by Dr. Bouman are most likely to be found in the same locations where we are most likely to find carcinoma, viz., in the region of the cecum, the stomach, and the rectum and sigmoid. One point of differentiation that I think is important is that in the case of fibroplastic exudates, although the texture of the tumor is almost as hard and as firm as carcinoma, one is usually conscious of going through inflammatory tissue and muscles infiltrated with serous exudate before the tumor comes into view. This also applies to the differentiation between diverticulum of the sigmoid and a similarly situated carcinoma.

DR. G. SCHWYZER: In connection with Dr. Bouman's thesis, I wish to mention a case which I observed before *x*-rays were commonly used. An old lady of over 60 years came to us for stomach trouble. We made a diagnosis of possible carcinoma of the pylorus on account of a tumor which we felt in the region of the pylorus and on account of the very marked emaciation combined with a very low hemoglobin.

We operated and found, as we thought, a carcinoma of the pylorus. The tumor was about three inches long and of hard consistency. There was no doubt in my mind nor in the minds of the two physicians present at the time of the operation as to the nature of the growth. The run-down condition of the patient was such that a resection of the pylorus was not advisable. We, therefore, made a posterior gastroenterostomy from which the patient speedily recovered. We advised the patient to return to us in about two months, expecting a general improvement and intending to add a resection for the carcinoma of the pylorus at such later time.

Upon reopening the abdomen we found to our great surprise a normal pylorus. No tumor was there. We were unable to discover any pathology.

Inasmuch as we do not find very much written in the English literature on this subject, I think we ought to

report any such case which may fit into this subject so well and carefully analyzed by Dr. H. Bouman.

Dr. Bouman (in closing): I wish to thank the gentlemen for their forbearance and particularly the Drs. Schwyzer and Hynes for the patients; without them I would not have been able to enlarge my surgical vision.

Regarding Dr. Zimmerman's remark, that we might suspect an inflammatory tumor from edema encountered in the skin: we did not see that, the general pathological procedure I have tried to describe. Bilharziasis, a disease occurring in Egypt and Arabia, should have been mentioned. The flukes remaining in the walls of the intestine are the reason for chronic inflammatory tumor formation.

As to Dr. Collins' question: The hyperplastic, allergic reaction may very well occur after appendectomy, but we hear of most of the cases before operation. As mentioned, the tumor may occur anywhere in the abdominal wall from any chronic irritation; the degree of allergy of a person is the important factor.

Thank you.

Dr. H. L. Ulrich (Minneapolis) read a paper entitled "Subacute Bacterial Endocarditis." Numerous lantern slides were shown.

The meeting adjourned.

John E. Hynes, M.D., Secretary.

CASE REPORTS

Members are requested to report interesting and unusual cases for publication in this department. Many cases reported at hospital staff meetings and similar meetings are very instructive and worthy of publication.

Minneapolis General Hospital

DIABETIC ACIDOSIS COMPLICATING PREGNANCY AND LABOR

Division B, Obstetrics and Gynecology

A. E. Benjamin, M.D., *Chief*

By John Urner, M.D., *Resident*

Mrs. A. M., aged 29 years, para 7, gravida 8, came to the out-patient department about January 1, 1925, because the visiting nurses had found that she had glycosuria. She had had no symptoms of any kind pointing to this condition. The patient's last menstrual period was May 10, 1924, making the date of expectancy February 17, 1925.

Her past pregnancies were as follows: In 1911, 1912, 1917, 1919, and 1920 she delivered normal full-term babies, with normal pregnancies, labors, and puerperii. In 1922 she delivered a normal appearing full-term child, which was stillborn following instrumental delivery due to prolonged labor. In 1923 she delivered a normal, full-term infant, with normal pregnancy, labor, and puerperium.

The history of the present pregnancy was as follows: The patient had felt quite well throughout the early months during the first two trimesters. During the third trimester she developed slight edema of the extremities, occasional blurred vision, and rather persistent constipation. She had had urgency, frequency, and nocturia during this time, but had not had the typical polyuria, polydipsia or polyphagia although polyphagia had been present to a slight extent.

At the time of her visit to the out-patient department, a large quantity of sugar was found in her urine. She was advised to enter the hospital, which she did, but remained only two days, leaving before her case could be studied thoroughly.

The patient was a well developed woman, 5 feet 6 inches in height, and weighing 185 pounds. Her skin was normal, except that it was rather pasty in appearance. Her teeth were carious. The thyroid was moderately enlarged. The heart and the chest were negative. The abdomen was enlarged to about the size of eight months pregnancy. The fetus was in O. D. A. position and in good condition. The patient's measurements were large in all diameters.

A blood sugar determination showed 0.21 with a Van Slyke of 64 per cent. Wassermann reaction was negative. The urine showed 15 gm. of sugar in a twenty-four hour specimen. The output was about 2,000 c.c. with a specific gravity of 0.1012. There was no acetone or diacetic acid present. Before her sugar tolerance could be determined the patient left the hospital, against advice, and went home on a diet low in carbohydrate and protein. She was instructed to return to the dispensary within a few days. She made two visits and each time the urine findings were about the same as those obtained in the hospital. She was repeatedly urged to come into the hospital again, as she was overdue. She made no other visits to the dispensary until March 1, when she complained of increasing weakness and dyspnea. Her breath smelled strongly of acetone. She was again admitted to the hospital March 1, 1925. The laboratory findings were as follows: Output of urine, 3,150 c.c., with 5 per cent sugar; acetone and diacetic present; hemoglobin, 70 per cent; erythrocytes, 3,900,000; leucocytes, 22,100; polymorphonuclears, 85 per cent. The patient felt well except for slight headaches and moderate dyspnea.

March 3 and 4 she was quite comfortable except for some slight cough and moderate dyspnea. On the morning of the fourth the blood chemistry report was as follows: Sugar 0.22 with a Van Slyke of 26 per cent. Castor oil and quinine were given in the hope of inducing labor, but without result.

March 5 at 9:00 a. m. the patient was very suddenly seized with extreme dyspnea of the Kussmal type. She had many emeses of greenish material. Intraocular tension was diminished on palpation. Respirations were 32. Medical consultation was obtained and a diagnosis of extreme acidosis was made, with recommendation for alkaline treatment combined with insulin. Her condition became progressively severe and alarming, so 45 gm. of glucose in 10 per cent solution were injected slowly intravenously, and with this 30 units of insulin were given. In an hour she showed great improvement. Although still very dyspneic, she breathed with much less difficulty. During the rest of the day she was given 40 units of insulin subcutaneously with apparently still more relief. Lavage was used to control the vomiting, and proctoclysis of glucose and sodium bicarbonate given for fluid intake. During the night she was given 2,000 c.c. hypodermoclysis,

followed by 10 units of insulin and 200 c.c. of orange juice by mouth.

The following morning she was considerably improved, although moderately dyspneic. The blood showed a Van Slyke of 24 per cent, and blood sugar 0.16. The urine showed a slight reduction, with no acetone or diacetic. At this time she no longer felt fetal movements, the fetal heart could not be heard, and a diagnosis of antepartum death of the fetus was made.

The patient's condition now seemed to permit interference with safety and an attempt was made to insert a bag, but without success because the vaginal walls were so redundant and no anesthesia was used. Ten units of insulin were given. The morning of March 7, 20 units of insulin were given and at noon a bag was inserted. This was expelled at 4 p. m., and was followed by normal delivery of a stillborn, over-developed male child. Twenty units of insulin were again given and the patient showed much improvement in that the dyspnea was markedly reduced. She began to take more nourishment and felt generally better. March 8 she was given 10 units of insulin, and on the ninth 15 units, with the result that her condition was almost normal. March 12 the blood sugar was 0.20, with a Van Slyke of 52 per cent.

March 13 she was transferred to the medical service and very promptly signed out of the hospital before her tolerance could be determined and a systematic diet regime carried out.

Asbury Hospital

MELENA (POSSIBLY DUODENAL ULCER) IN NEWBORN

Fred L. Adair, M.D.
Minneapolis

B4041.—April 19, 1924. Age 28 years. Married sixteen months. Gravida I. The patient's last menstruation period was January 9 to 13, 1924. There had been slight nausea, but she was feeling well at the time of examination, and had always been in good health. Menses began when thirteen years of age, regular twenty-eight days, of four days' duration.

Past history—Mumps, varicella, pertussis, measles, and in 1918, influenza.

Physical examination—The uterus was enlarged to about the size of three and one-half months pregnancy. A soft, blowing systolic murmur was noted at the right base of the heart. Height, 5 feet, 1.5 inches. Weight, 104.5 pounds. Abdomen, F. 12, N. 14.5, X. 32, Cir. 73. Pelvic measurements, Insp. 23, Incr. 26, Intr. 28.5, E. C., 19.5, D. C. and Trans. ample. Temperature, 98.4; pulse, 98; blood pressure, 112/70. Urine, specific gravity, 1020, acid reaction, albumin and sugar, negative, microscopic examination, negative. Blood, hemoglobin 82 per cent, erythrocytes, 4,320,000; leucocytes, 14,600.

After this examination the patient left town and was not seen again until she entered the New Asbury Hospital (Minneapolis) October 19, 1924. At that time she stated that she had had labor pains irregularly for fifty-four hours, but not very severe or constant.

8:00 a. m. Position O. D. P.; head —3; cervix effaced; os dilated 3 cm.

12:30 p. m. Os dilated 5 cm.; head +2.

7:00 p. m. Dilatation complete; head +2, transverse arrest.

1:00 a. m. (October 20) position O. D. A.

3:25 a. m. Membranes ruptured.

4:30 a. m. Head on perineum; caput visible.

4:55 a. m. Low forceps applied.

5:05 a. m. Delivered.

The hemorrhage was about 300 c.c. The placenta and cord were normal. There was a first degree laceration, which was repaired.

The baby was a female, mature, not apneic, and had no external injury to the head. The weight at birth was 6 pounds 6½ ounces. Temperature: 98.4 to 97.8 on the first day; 99.8 to 97.8 on the second day; 97 to 96.2 on the third day; 99.6 on the fourth day, axilla. The loss of weight was about 8 ounces.

On the third day the baby had a bloody stool about 5:00 p. m. Fifty cubic centimeters of whole blood from the father were given subcutaneously at 7:30 p. m. At 10:00 p. m. 40 c.c. were given. During the night the baby had six bloody stools. On the fourth day 60 c.c. of blood were given intramuscularly and 30 c.c. by mouth. The bleeding continued and it was decided to give a transfusion. A fontanelle transfusion was attempted, but with beginning edema it was considered inadvisable to continue, and 130 c.c. were given intraperitoneally. That afternoon (October 23) the patient left the hospital against the advice of the physicians to take Christian Science treatment.

On October 22 the baby's bleeding time was one and one-half minutes and the coagulation time six minutes.

HERPES GESTATIONIS (DUHRING'S DISEASE IN PREGNANCY) WITH AN EFFECTIVE TREATMENT FOR IT

Ross M. Gamble, M.D.
Ellendale, Minn.

The patient, a woman aged 23, had been under my care since she became pregnant in May, 1924. She previously had had four miscarriages, so was particularly careful of herself all through pregnancy. On December 16th, when 7 months pregnant, she abruptly developed a papular eruption on both legs which within a short time changed to papulo-vesicular in type. Many of these vesicles then coalesced to form blebs, some of which were as large as 1.5 cm. in diameter. With the eruption was an intense itching. A diagnosis of *herpes gestationis* was made, which was corroborated by two other physicians.

From other cases reported in the literature, it was found that no treatment save the premature induction of labor had ever been found very effective. This patient was particularly desirous of children, however, so everything which had been described as palliative of this condition was tried. Arsenic was given in the form of Fowler's solution and KI was also tried. Locally, various alkaline washes, calamin lotion, phenol-boric solution and other anti-pruritics were tried but none of them had much effect on the eruption or on the itching. The patient did not sleep for three nights, and on the fourth one-half grain of morphine sulphate only gave her a little over one hour of

sleep. There was also some systemic disturbance as noted in repeated emesis and a trace of albumin in the urine.

Ordinarily of late, organotherapy has been much overrated, but some of these obscure skin conditions do seem to have as a basis an adrenal dysfunction. Accordingly this patient was given 2 grains of desiccated suprarenal substance together with two grains of calcium lactate, five times a day, and twice daily she received a hypodermic of 7 minims of 1 to 1000 adrenalin. Thirty-six hours after this treatment was instituted, the itching was much relieved and after 4 days the eruption had faded, leaving crusts where the blebs had been which finally fell off and left erythematous spots with a slight pigmentation. After four or five days this treatment was discontinued and the patient was about normal for ten or twelve days. At the end of this time there was a return of the eruption and itching not only on the legs but also on the arms and to a lesser degree on the trunk. The same treatment was instituted with the same relief, except that this time the treatment was continued for two weeks (until Jan. 22, 1925). The patient was delivered Feb. 19th of a full term, living child. The delivery was normal in every way and the placenta was also normal.

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PREGNANCY WITH COMPLICATIONS: FACE PRESENTATION, CHIN ANTERIOR; ROTATION WITH FORCEPS; LATERAL CUTANEOUS FEMORAL NEURITIS. CASE REPORT

DANIEL H. BESSESEN, M.D.
Minneapolis, Minn.

This patient was followed until delivery by Dr. E. W. Alger, when, in his absence, she was referred to my care. The history showed nothing abnormal in a woman 28 years old with two previous full term deliveries of well developed boy and girl. Marked pain was complained of in the lower front of the pelvis in labor. Physical examination was entirely negative with the exception of a slight mitral regurgitation so often present in pregnant women. Rectal examination gave the impression of a face presentation, occiput posterior with complete dilatation. When more severe pain was complained of with little progress, the vaginal examination made after carefully preparing the patient proved the correctness of this impression. Dewees' forceps without the traction apparatus were applied in the usual manner, adjusting them to the child's head, and making sure of the locking, the fetal head was thrust well up into the mother's abdomen, rotated and brought down into the pelvis again. Due to the extreme curve of the forceps, it was necessary to remove them at this point and replace them in the usual curve to correspond to the axis of the mother's pelvis, after which the delivery of a 12-pound boy was without event. No tear was apparent in the perineum and mother and child made splendid recoveries. Three weeks after delivery, the mother complained of pain over the outer side of the left thigh. This proved to be a left lateral femoral neuritis which cleared up very quickly with telatherm.

Pain in the lower front of the pelvis indicates pressure on the urethra and is usually brought about by the bony obstruction to the passage of the head. This may be present in a large head, transverse position or tumor masses, but most commonly it means a face presentation, occiput posterior.

The rotation of the head in occiput posterior positions may be made with the hand or with the forceps, depending upon the station of the child and upon the roominess of the pelvis. This delivery was made in the home, and less danger was believed to be incurred from infection by performing rotation with forceps than by doing a version. The Kielland forceps are especially designed for this type of delivery, because the shanks of the blades are only very slightly curved and it is not necessary after rotation to remove and replace the forceps as was required in this delivery. To use forceps, the patient should be under deep anesthesia, the uterus dilated, and the membranes ruptured. The forceps rotation is potentially dangerous because the pelvis of the mother may be injured by the turning blades.

The neuritis which occurred in this woman probably resulted from the mechanical injury done to the nerves on the left side of the pelvis in thrusting the head up into the abdomen and rotating. The awkward curve of the blades must be considered as partly liable to produce this injury. This possibility is diminished by the use of the Kielland blades.

Minneapolis General Hospital

POSTDIPHTHERETIC NEURITIS

J. C. MICHAEL, M.D.
Chief of Service

Mrs. M. M., aged 25 years, housewife. The patient was admitted to the neurological ward March 20, 1925, with paresis of legs and arms, generalized hyperesthesia, numbness of finger and toe tips, dysphasia, dysphagia, tinnitus, and blurred vision.

The previous history was negative until February 6, when the patient developed a sore throat. She was treated for quinsy until February 10, when diphtheria was diagnosed. Antitoxin was administered immediately, and three times thereafter at daily intervals. Thickness of speech and difficulty in swallowing appeared on February 11. Not long after, the finger tips began to feel numb. February 26 vision became blurred, and February 27 the patient was so weak that she was unable to walk. Her ears began to ring and since that time she had frequently had sharp pains through her ears.

Objective examination of the patient at the time of admission to the neurological ward revealed impairment of the muscles of the eyes, absence of triceps, biceps, knee and ankle jerks, and paralysis of the soft palate. March 29 the pulse rate increased to 130, temperature to 100, and respiration to 40.

The patient was seen April 7, at which time there was

evidence of much improvement. Temperature, pulse, and respiration had returned to normal.

This case is of interest particularly because of the early treatment and because of the widespread nerve involvement. Although palsy of the soft palate and pharyngeal muscles not infrequently follows diphtheritic infection, widespread nerve involvement is but rarely seen when antitoxin is administered promptly.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

THE INHERITANCE FACTOR IN TUBERCULOSIS—PREDISPOSITION OR IMMUNITY: Godias J. Drolet (The American Review of Tuberculosis, 1924, x, 280). Drolet finds a slightly larger percentage (66) of positive tuberculin reactions (Von Pirquet test) in 461 children of non-tuberculous parents than in 1,234 children of tuberculous parents (64 per cent) at the Bellevue Tuberculosis Dispensary (New York City). Of 2,605 adults having tuberculosis, 12 per cent gave a history of tuberculosis in the preceding generation as compared to 13 per cent for 1,638 non-tuberculous adults. When the children and adults were considered together, 30 per cent of all the non-tuberculous cases reported tuberculosis in the preceding generation as against 14 per cent of the tuberculous patients.

Studying the frequency of tuberculosis in the children of tuberculous parents Drolet found that among 1,577 such cases 34 per cent were tuberculous. Among 5,852 cases with negative parental history 59 per cent were tuberculous.

As to the results of treatment it was found that of 159 patients with a parental history of tuberculosis, 16 per cent became apparently cured or arrested while of 1,059 cases with a negative family history only 7 per cent reached a similar condition.

Drolet concludes that the children of tuberculous parents do not inherit even a predisposition to the disease but an increasing degree of immunity instead.

A. T. Laird, M.D.

SURGERY

SUPERVISORS:
DONALD K. BACON,
LOWRY BLDG., ST. PAUL
VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

ANEURYSM OF THE RENAL ARTERY: Hilaire Schramm, Levou, Poland (Annals of Surgery, 1925, lxxxi, 105-107). In a recent review (Annals of Surgery, Nov., 1923) Conroy assembled thirty-two cases of aneurysm of the renal artery. The author of this article adds two cases to this number.

One, a male, thirty-two years of age, was stabbed in the left loin. The hemorrhage was checked with a tampon. Hematuria followed for sixteen days and a month after the wound there was severe hemorrhage from the bladder, which could be controlled for a short while by pressure on the left loin and by compressing the penis. About one and one-half years after he had been wounded he was admitted to the hospital suffering from marked anemia. Upon examination there was a large tumor in the left kidney region reaching to the linea alba, stretching under the left costal border below to the anterior superior iliac spine. At operation this tumor was found to be intimately adherent to the left kidney and to the aorta. This with the kidney was removed. The tumor proved to be an aneurysmal sac of the renal artery, the size of an orange.

The second case reported was one of Doctor Sakolowski's. In a woman of fifty, who died of symptoms of internal hemorrhage, a postmortem examination revealed an extensive hematoma in the left loin, the source of which was a ruptured aneurysm of the renal artery, the size of a walnut.

Of the thirty-four cases in literature, sixteen were true spontaneous aneurysms. The average age of these patients was 56. Many were found only at postmortem examination. In eighteen cases there were traumatic aneurysms. In fifteen of these the injury was subcutaneous; only three times was there an open wound of the kidney.

The prognosis is very grave in these cases. All cases treated conservatively died; of those operated two died and seven were healed. Operation is almost always serious and difficult, especially on account of the danger of rupturing the sac, or because of the proximity of the aneurysm to the aortic wall. In most cases the kidney must be removed.

J. K. Holloway, M.D.

LYMPHATICOSTOMY: Edwin P. Lehman and Clover H. Copher (Archives of Surgery, Volume 10, No. 2, March, 1925, pp. 742-751). The authors report their experience in work done upon animals with peritonitis and one case of general peritonitis in a human being in which lymphaticostomy was performed. This work was done to check up the work reported previously by Costain.

Fourteen dogs had their appendices ligated in the same way in which Costain produced peritonitis. Four of these

survived. The average length of life of those which died after the procedure was 4.2 days. Fourteen other dogs prepared as above had a drainage of the thoracic duct twenty-four hours later. All of these died and the average length of life was 2.7 days.

Further experimental work was done to investigate the effect of lymphaticostomy in high intestinal obstruction. Fourteen dogs with a fifteen centimeter isolated high jejunal loop lived an average of 2.3 days. Fourteen other dogs underwent drainage of the thoracic duct twenty-four hours after construction of the high jejunal loops as before. The average length of life in this group was 3.8 days.

The case report concerned a male twenty-seven years of age with general purulent peritonitis caused by a ruptured appendix. Lymphaticostomy was done in this case and was followed by improvement in the patient's general condition even though he died some days later.

The authors summarize their results as follows:

"Drainage of the thoracic duct in the dog does not exert a favorable influence on general peritonitis. It may exert a slightly favorable influence in the course of toxemia from intestinal obstruction. Clinical observation of a single case of general peritonitis suggests a slightly favorable effect from drainage of the thoracic duct."

WILLIAM P. HERBST, M.D.

RADIUM IN THE TREATMENT OF PROSTATIC CARCINOMA: B. S. Barringer, M.D. (Annals Surgery, 1924, LXXX, 881-884). The technique of radium application described in this article differs somewhat from the methods of Bumpus and Young. Screened radium needles are introduced through the perineum, one to two centimeters apart, throughout the carcinomatous prostate. Other needles are passed into the seminal vesicles, at times through the rectum. The dosage varies with the size of the tumor, but rarely exceeds 800 mc. hours. The treatment is completed within two to three months. In cases which react well the radium treatments are repeated every two to three months until the prostate is a sclerosed mass. If urethral invasion occurs treatment is directed there.

In advanced cases with urinary obstruction the author uses a modified Young punch instrument, and removes several large pieces of tissue from the bladder neck. In thirteen cases thus operated, twelve showed some reduction in the amount of residual urine, though the operation was considered successful is only 8 (61.8%).

Of forty-six cases, where malignancy was limited to the gland in but one, five lived more than five years without sign of recurrence. Of forty-four cases reviewed showing bony metastasis, thirty-nine had involvement of the lumbar spine, pelvis, and upper end of the femur. Most of the metastases were the sclerosing hyperplastic type.

The author believes five to ten per cent of cases of carcinoma should be controlled by radium. He recommends that in all cases where diagnosis is in question a "diagnostic needle," which he describes, should be used to secure specimens of prostatic tissue for biopsy. It is considered of especial value in early and questionable cases.

JACKSON K. HOLLOWAY, M.D.

MELANOMA OF THE NAIL BED: T. Banford Jones, M.D. (Annals of Surgery, vol. lxxx, 1924, pp. 839-847). Dr. A. E. Hertzler, in a recent review of the literature, was able to find seventeen cases of melanoma of the nail bed. The author reviews three cases seen at the Massachusetts General Hospital. The onset of this condition is frequently attributed to injury and closely resembles whitlow. However, at the edge of the inflamed nail a little border of coal black color may be seen. Trauma antedated the subsequent development of lesions in most of the cases reported, including all of the author's. The condition is one of slow development, the period of quiescence averaging from four to five years. However, once the initial lesion progresses noticeably, a rapid fatal course is inevitable. The lesion appears as a paronychia but is chronic. It gradually increases in size, eventually ulcerating and destroying the nail. Presence of pigment is pathognomonic. Following this stage progress is very rapid and metastatic growth is soon evidenced. Pain and local tenderness may characterize the later stages of development.

In suspicious cases biopsy should be made. Minimum treatment means amputation of the digit and complete resection of the regional glands.

In the three cases reported, diagnosis was made too late to prevent death from general metastasis.

J. K. HOLLOWAY, M.D.

PYLORIC SPASM AND ITS SURGICAL TREATMENT: Raffaele Bastianelli, Rome, Italy (Annals of Surgery, 1925, vol. lxxxi, pp. 45-51). The author reports the results of four cases operated upon in which the findings were those of thickened pylorus, but without demonstrable lesion. The clinical symptoms were those of pyloric spasm. Sphincterotomy, according to Rammstedt, produced beneficial results. The cases have been done recently so no final conclusions may be drawn, although the primary results are very encouraging. The author discusses theories of pyloric spasm. J. K. HOLLOWAY, M.D.

IMPROVED TECHNIC FOR INTESTINAL ANASTOMOSIS: Clyde A. Roeder, M.D. (Annals of Surgery, lxxx, 1924, pp. 939-943). Intestinal anastomosis is confronted with the highest mortality rate of any elective operation within the abdominal cavity, owing to (1) lack of aseptic technic enhanced by preoperative morbidity, (2) leakage, (3) secondary obstruction, (4) hemorrhage.

The author offers a modification in the form of an aseptic anastomosis. His technic is as follows: Crushed edges of intestines are approximated by a mattress suture drawn tightly. The contaminated end of suture is swabbed with phenol. A continuous Lembert silk seromuscular suture then inverts the cut and crushed edges. One end of the mattress is then cut short and the remainder is withdrawn from the gut.

The author claims very good results from this improved technic. He states that intestinal mucosa will not bleed when not sutured if it is previously crushed and cut with a cautery, and it will also unite in due time with no secondary ulcer formation.

J. K. HOLLOWAY, M.D.

ROENTGENOLOGY

SUPERVISORS:
LEO G. RIGLER,
MPLS. GEN'L HOSPITAL, MINNEAPOLIS
A. U. DESJARDINS,
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THE CLINICAL IMPORTANCE OF CHRONIC CHANGES IN THE APPENDIX: Franklin W. White (Am. Jour. Roent., Vol. 13, p. 12, Jan., 1925). Chronic changes in the appendix are due to previous or recurrent attacks of acute inflammation.

The direct roentgen signs are as follows:

1. Tenderness over a filled appendix is the most significant. It is not a valuable sign, however, in ptosis cases.

2. Failure to fill cannot be interpreted so no diagnosis can be made.

3. Failure to empty for several days after the cecum has emptied is important.

4. Fixation, especially of the tip or the middle portion, is of considerable significance.

5. Changes in shape, if very constant, aid in the diagnosis. Kinking is often only apparent.

6. Position is variable normally but a very high or very low appendix or one behind the cecum merits consideration.

The indirect signs are:

1. Ileal stasis is of importance except where other causes can be made out, such as general atony, old age, etc.

2. Pyloric and duodenal spasm are uncommon, occurring in only 7 per cent of the author's positive cases. There are so many other causes for this condition that it has little significance.

The signs given are of value, if several are present in the same case, as corroborative evidence when a fairly good history of this condition is present. The roentgen evidence is so striking that great care must be exercised not to over-emphasize it. The most important signs found in the author's positive cases were tenderness, constant changes in shape, fixation, and abnormal position.

LEO G. RIGLER, M.D.

THE ROENTGEN DIAGNOSIS OF ESOPHAGEAL DIVERTICULA: M. Haudek (Fort. a. d. Geb. D. Roentgenstrahlen, Vol. 32, p. 556, Dec., 1924). Eleven cases of small diverticula of the esophagus are described. The small traction diverticula are found secondarily during the roentgen examination, if systematic thorough investigation is made. The use of a thick barium paste, the patient being in the recumbent position with the hips elevated, is most successful. The examination must be made at all angles and great care must be exercised as the diverticula empty very rapidly.

These pockets are frequently overlooked because they are often symptomless and roentgen examination is done only when complications such as spasm occur. Nevertheless they may be the cause of severe ulcerations. They are most often secondary to mediastinal lesions, and are commonly found in the anterior wall of the proximal third of the esophagus.

Pulsion diverticula are much less common and cause acute symptoms usually as a result of the retention of foreign bodies such as food particles.

The importance of the demonstration of small diverticula is prognostic in that they may later produce severe results such as ulceration, retention of food, or perforation into the esophagus by the caseous mediastinal glands to which they are adherent.

LEO G. RIGLER, M.D.

ATELECTASIS AS A ROENTGEN-RAY SIGN OF FOREIGN BODY IN THE AIR PASSAGES: Manges (Am. Jour. Roent., June, 1924). The roentgenographic appearance of atelectasis is as follows: Extreme density of the portion of lung affected is present; the density is usually confined to one lobe and follows the interlobar fissure; heart and mediastinum are displaced toward the affected side; there is elevation of the diaphragm on the affected side.

This condition is differentiated from massive pulmonary consolidations, massive tumors, pleural thickening and pleural exudate chiefly by the displacement of the heart and mediastinum toward the atelectatic lung. It cannot be distinguished from extensive lung fibrosis by the roentgenogram alone.

Where the mass obstructing the bronchus completely closes it off to inspiration, atelectasis occurs due to absorption of the air in the affected portion of the lung. If the obstruction is incomplete, emphysema will result, giving roentgen signs which are the reverse of those described for atelectasis, namely, increased radiability of the affected lung, depresion of the diaphragm on the affected side, displacement of the heart and mediastinum away from the affected side.

LEO G. RIGLER.

MUST CHOOSE DOCTORS FOR FITNESS

Medical schools do not urge a general influx of students and have standards which make it likely that most of those who gain admission will have the ability to succeed, according to Dean E. P. Lyon, of the Medical School.

"Some physicians make a good deal of money," he says, "but men should go into medicine because they are drawn to it, because they are assured of a useful life and a reasonably good living, not for other reasons. The problem of selecting men who shall study medicine is not one of deciding whether there are too few or too many doctors, nor one of financial prospects. It is a question of fitness."

The three main characteristics of the medical student should be, Dean Lyon thinks, that he should seek to render service rather than gain wealth, that he should be of high integrity, and that he should be a person of high intelligence. Medicine, he explains, rests on complex sciences. It involves a very large body of certain knowledge that must be mastered and retained, and requires use of judgment in

the highest degree, because the knowledge must be applied to living persons. Error must be held to an irreducible minimum when it comes to applying facts in a particular case.

"Men of the right sort need not hesitate to enter medicine," Dean Lyon says. "Physicians are somewhat better paid than men in some other professions, but they put in a long and costly period of training and carry grave responsibilities."

For dentistry one may turn to a vocational bulletin recently issued by Dean Alfred Owre, a recognized leader in his profession.

"A well qualified dentist can always make an adequate living immediately after graduation," he writes. "This is especially so if he is willing to leave the cities and practice in less thickly settled communities. In the large cities, except in outlying districts, competition is keener. In dentistry, as in every other profession, there is always room at the top. It is at the top that there are opportunities for specialization, which are both financially rewarding and professionally satisfying.

"The most important question every young man considering his life work should ask is, 'Can I find in this profession full expression for my faculties? Can I look forward to continued cultural as well as professional development?' This can be answered in the affirmative. Modern dentistry, as it is and as it promises to be, offers to the properly qualified and trained graduate every opportunity for professional growth. It also offers, as few professions can, satisfaction of the creative instinct."—*Minnesota Chats, Vol. 4, No. 75.*

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

INTERNATIONAL CLINICS. Edited by Henry W. Cattell, A.M., M.D., Philadelphia, in collaboration with others. Volume I. Thirty-fifth series, 1925. 301 pages. Illus. Philadelphia & London: J. B. Lippincott Co., 1925.

FROM INFANCY TO CHILDHOOD. Richard M. Smith, M.D., Assistant Professor of Child Hygiene, Harvard University; Associate Physician, Children's Hospital; Visiting Physician, Infants Hospital, Boston. 105 pages. Cloth, $1.25. Boston: Atlantic Monthly Press, 1925.

THE PRACTICAL MEDICINE SERIES. Gynecology and Obstetrics. Vol. V. Edited by Thomas G. Watkins, M.D., F.A.C.S., and Joseph B. De Lee, A.M., M.D., in collaboration with J. P. Greenhill, B.S., M.D. 534 pages. Illus. Cloth, $2.00. Chicago: The Year Book Publishers, 1925.

DISEASES AND DEFORMITIES OF THE FOOT. John Joseph Nutt, B.L., M.D., F.A.C.S., Professor of Orthopedic Surgery, Polyclinic Medical School and Hospital, etc. 2nd edition, revised and enlarged. 309 pages. Illus. Cloth, $4.00. New York: E. B. Treat and Company, 1925.

ANATOMY OF THE HUMAN BODY. Henry Gray, F.R.S. Twenty-first edition. By Warren H. Lewis. 1417 pages. Illustrated. Lea & Febiger, Phil. & N. Y., 1924. $10.00.

When a new edition of Gray's Anatomy appears it is needless for the reviewer to write many words in praise of the work, for it has been for so long a time, since 1858 in fact, the standard text book of descriptive anatomy, that it is only the new editions that need mention. The latest edition, the twenty-first, will seem very familiar to users of the older editions, but new sections on the heart and ductless glands will be found and some of the old plates have apparently been replaced by newer and better ones. The embryological sections are enlarged and very clearly written. The English B. N. A. nomenclature is again used and older practitioners will not be confused by finding an unfamiliar terminology.

WALLACE H. COLE, M.D.

FUNDAMENTALS OF HUMAN PHYSIOLOGY. R. G. Pearce and J. J. R. Macleod. St. Louis: C. V. Mosby Co., 1924.

As the name implies, this book gives the fundamentals of human physiology. As it is written for people without much preliminary detailed knowledge of anatomy, chemistry or physics, it is suitable for nurses, home economic students, etc.

The subject matter is well arranged and it is illustrated sufficiently. The book is used in certain elementary classes at the University of Minnesota.

F. H. SCOTT, M.D.

MANAGEMENT OF DIABETES. George A. Harrop, Jr., M.D. 190 pages. Cloth, $2.00. New York: Paul B. Hoeber, 1924.

From June to September, 1923, a postgraduate course of lectures was given at the Presbyterian Hospital, New York, by various members of the staff of the hospital to some six hundred practicing physicians on the subject of the present day treatment of diabetes. This small volume is based on those lectures and for conciseness and practical assistance to the general practitioner is the very best work encountered by the reviewer.

Enough time has now elapsed since the advent of insulin so that the method of its use in the treatment of diabetes has been established.

The present conception of metabolism, the ketogenic antiketogenic ratio, ketosis and acidosis is briefly described and laboratory methods for determining abnormalities of metabolism in diabetes are clearly presented. Practical methods for determining proper diets are well described and food tables with valuable suggestions for preparing diets are given. The practitioner who is called upon to treat diabetes and who has been perhaps confused by the variety of views appearing in the literature will find in this small volume a most complete but at the same time well boiled down summary of the treatment of diabetes.

C. B. DRAKE, M. D.

A PRACTICAL COURSE IN STANDARDIZED PHYSIOTHERAPY, under auspices of Biophysical Research Department of Victor X-Ray Corporation, is now available to physicians. Offers a highly practical knowledge of all the fundamental principles that go to make up the standards of modern scientific physiotherapeutic work. Course requires one week's time. For further information apply to J. F. Wainwright, Registrar, 236 South Robey Street, Chicago, Ill.

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Weir, J. D.....Beardsley

Park Region District Medical Society

Ottertail, Douglas, Grant and Wilkin Counties
Regular meetings, second Wednesday in January, April, July and October
Annual meeting in October

President
Broker, W. S.....Battle Lake
Secretary
Paulson, Theo. S.....Fergus Falls

Baker, A. C.....Fergus Falls
Boysen, P. .....Pelican Rapids
Brabec, F. J.....Perham
Broker, W. S.....Battle Lake
Burnap, W. L.....Fergus Falls
Cowing, P. G.....Evansville
Drought, W. W.....Fergus Falls
Esser, John .....Perham
Estrem, C. O.....Fergus Falls
Freeborn, J. A.....Fergus Falls
Goodson, Catherine M..Retreat, Pa.
Hand, W. R.....Elbow Lake
Haskell, A. D.....Alexandria
Haugen, G. T.....Fergus Falls
Kittelson, Theo. N....Fergus Falls
Lee, W. A.....Fergus Falls
Lewis, A. J.....Henning
Liebold, H. H.....Parkers Prairie
Love, Fred A.....Carlos
Meckstroth, C. N.....Brandon
Naegeli, Frank.....Fergus Falls
Nelson, O. N.....Battle Lake
Otto, H. C.....Frazee
Parson, L. R.....Elbow Lake
Patterson, W. L.....Fergus Falls
Paulson, Theo. S.....Fergus Falls
Powers, F. W.....Barrett
Reeve, E. T.....Elbow Lake
Sargeant, H. L.....Fergus Falls
Satersmoen, Theo...Pelican Rapids
Sherping, O. Th.....Fergus Falls
Tanquist, E. .....Alexandria
Vail, J. B. .....Henning
Vigen, J. G.....Fergus Falls
Wray, W. E.....Campbell

SECOND DISTRICT

COUNCILOR, J. G. MILLSPAUGH, M.D. (1 year).....Little Falls

Upper Mississippi Medical Society

Aitkin, Crow Wing, Morrison, Cass, Todd, Wadena, Clearwater, Koochiching, Hubbard, Itasca and Beltrami Counties
Regular meetings in May and January
Annual meeting, January

President
Davis, L. T.....Wadena
Secretary
Badeaux, G. I.....Brainerd

Ahrens, E. G.....Ah Gwah Ching
Allen, F. A.....Crosby
Allen, F. H.....Staples
Anderson, A. S....Ah Gwah Ching
Badeaux, G. I.....Brainerd
Beise, R. A.....Brainerd
Bone, Merle .....Kelliher
Button, A. J.....Hackensack
Cantwell, W. F.....Internat'l Falls
Christie, G. R.....Long Prairie
Christie, R. L.....Long Prairie
Corrigan, J. E.....Spooner
Craig, C. C....International Falls
Crowl, Verne C.....Bertha
Davis, L. T.....Wadena
Davis, T. C.....Wadena
Derauf, B. I.....Brainerd
Douglass, J. E...State Sanatorium
Forrest, C. G.....Clearbrook
Gerber, Milo P.....Brainerd
Ghostley, Mary C..Internat'l Falls
Goodheart, C. J.....Akeley
Halenbeck, P. L.....Crosby
Holst, C. F.....Little Falls
Holst, J. B.....Little Falls
House, Z. E.....Cass Lake
Houston, C. A.....Park Rapids
Hooslef, J.....International Falls
Johnson, E. W.....Bemidji
Johnson, O. V.....Sebeka
Kelly, B. W.....Aitkin
Kenyon, Paul .....Wadena
Kerlan, S. Z.....McGregor
Laney, R. L.....Puposky
McHugh, R. F.....Aitkin
McKennon, J. J.....Wadena
Miller, W. A.....New York Mills
Millspaugh, J. G.....Little Falls
Moyer, Ralph E.....Bemidji
Nelson, Nesmuth .....Brainerd
Nicholson, Jos. .....Brainerd
Nordin, C. G.....Brainerd
Parrott, B. W.....Long Prairie
Pengelly, E. J.....Ironton
Ratcliffe, J. J.....Aitkin
Roberts, L. M.....Little Falls
Shannon, S. S.....Crosby
Smith, B. A.....Crosby
Thabes, J. A.....Brainerd
Waldie, Geo. McL.....Wadena
Watson, A. M.....Royalton
Watson, J. D.....Holdingford
Wilcox, F. L.....Walker
Will, W. W.....Bertha
Williams, R. J.....Pine River

THIRD DISTRICT

COUNCILOR, H. LONGSTREET TAYLOR, M.D. (1 year).....St. Paul

Ramsey County Medical Society

Regular meetings, last Monday of each month except June, July and August
Annual meeting last Monday in January

President
Hammes, E. M.....St. Paul
Secretary
Schulze, A. G.....St. Paul

Abbott, J. S.....St. Paul
Abramovich, J. H.....St. Paul
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Alberts, Max W.....St. Paul
Alden, J. F.....St. Paul
Aldes, Harry .....St. Paul
Alexander, F. H.....St. Paul
Allen, Mason .....St. Paul
Anderson, W. T.....St. Paul
Arends, A. T.....St. Paul
Armstrong, J. M.....St. Paul
Arnquist, A. S.....St. Paul
Arouni, Khalil .....St. Paul
Arzt, C. P. .....St. Paul
Bacon, Donald K.....St. Paul
Bacon, Knox .....St. Paul
Bacon, L. C.....St. Paul
Balcome, F. E.....St. Paul
Ball, C. R.....St. Paul
Barry, L. W.....St. Paul
Barsness, Nellie .....St. Paul
Beadle, W. D.....Cannon Falls
Beals, Hugh .....St. Paul
Bell, C. C.....St. Paul
Benepe, L. M.....St. Paul
Bennion, P. H.....St. Paul
Bentley, Norman P.....St. Paul
Berrisford, Paul D.....St. Paul
Binger, H. E.....St. Paul
Birnberg, T. L.....St. Paul
Bock, R. A.....St. Paul
Boeckmann, Eduard .....St. Paul
Boeckmann, Egil .....St. Paul
Bohland, E. H.....St. Paul
Bole, R. S.....St. Paul
Boleyn, E. S.....Stillwater
Bolstad, H. C.....St. Paul
Bosworth, Robinson .....St. Paul
Bouma, L. R.....St. Paul
Brand, G. D. .....St. Paul
Bray, E. R.....St. Paul
Brimhall, J. B.....St. Paul
Brodie, Walter D.....St. Paul
Brooks, D. F.....St. Paul
Brooks, G. F.....St. Paul
Brown, Edw. I.....St. Paul
Brown, John C.....St. Paul
Burch, F. E.....St. Paul
Burfiend, G. H.....St. Paul
Burns, F. W.....St. Paul
Burns, R. M.....St. Paul
Buscher, H. .....St. Paul
Caldwell, Kenneth S.....St. Paul
Cameron, J. A.....St. Paul
Campbell, J. E.....South St. Paul
Cannon, Harry .....St. Paul
Carman, C. L.....St. Paul
Carman, Paul I.....St. Paul
Carroll, Wm. C.....St. Paul
Carter, Fred C.....St. Paul
Cavanaugh, J. O.....St. Paul
Chandler, O. B.....St. Paul
Chatterton, C. C.....St. Paul
Christiansen, A. .....St. Paul
Christison, J. T.....St. Paul
Clark, T. C...Soldiers Home, Mpls.
Cobb, S. G.....St. Paul
Colby, Woodard .....St. Paul
Cole, Wallace .....St. Paul
Collie, H. G.....St. Paul
Colvin, A. R.....St. Paul
Comstock, A. E.....St. Paul
Conner, Wm. H.....St. Paul
Connor, C. E.....St. Paul
Cook, Paul B.....St. Paul
Countryman, Roger S.....St. Paul
Cowern, E. W.....North St. Paul
Critchfield, L. R.....St. Paul
Dack, L. G.....St. Paul
Darling, J. B.....St. Paul
Daugherty, E. B.....St. Paul
Daugherty, L. E.....St. Paul
Davis, Herbert .....St. Paul
Davis, William .....St. Paul
Dedolph, K. .....St. Paul
Dickson, Thos. H., Jr.....St. Paul
Dittman, Geo. C.....St. Paul
Dohm, A. J.....St. Paul
Donohue, P. F.....St. Paul
Drake, Carl B.....St. Paul
Dunn, J. N.....St. Paul
Earl, Geo. A.....St. Paul
Earl, Robert O.....St. Paul
Edlund, G. .....St. Paul
Ely, O. S.....South St. Paul
Engberg, E. J.....St. Paul
Ernest, G. C.....St. Paul
Eshelby, E. C.....St. Paul
Evert, John A.....St. Paul
Fahey, E. W.....St. Paul
Ferguson, J. C.....St. Paul
Fesler, Harold H.....St. Paul
Flagstad, A. E.....St. Paul
Fogarty, C. W.....St. Paul
Foley, F. E. B.....St. Paul
Freeman, C. D.....St. Paul
Fulton, J. F.....St. Paul
Furber, W. W.....Cottage Grove
Gager, E. C.....St. Paul
Gardiner, D. G.....St. Paul
Geer, Everett K.....St. Paul
Geissinger, John D.....St. Paul
Geist, Geo. A.....St. Paul
Ghent, Harry .....St. Paul
Ghent, M. M.....St. Paul
Giere, E. O.....St. Paul
Gilfillan, J. S.....St. Paul
Ginsberg, Wm. .....St. Paul
Goltz, E. V.....St. Paul
Gotham, C. L.....St. Paul
Grant, H. W. .....St. Paul
Gratzek, Thos. .....St. Paul
Greene, C. L.....St. Paul
Gruenhagen, Arnold P....St. Paul
Hagaman, Geo. K.....St. Paul
Hall, A. R.....St. Paul
Halper, P. A.....St. Paul
Hammes, E. M.....St. Paul
Hammond, J. F.....St. Paul
Harmon, G. E.....St. Paul
Hauser, Victor .....St. Paul
Hawkins, V. J.....St. Paul
Heath, A. C. .....St. Paul
Hengstler, W. H.....St. Paul
Hensel, C. N.....St. Paul
Herrmann, E. T.....St. Paul
Hesselgrave, S. S.....St. Paul
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
Hilger, L. A.....St. Paul
Hochfilzer, J. J.....St. Paul
Hoff, Alfred .....St. Paul
Hoff, Peder A.....St. Paul
Hoffman, Max H.....St. Paul
Holcomb, J. T.....St. Paul
Holcomb, O. W.....St. Paul
Holl, P. M.....Minneapolis
Howard, M. A.....St. Paul
Howard, W. S.....St. Paul
Hullsiek, H. E.....St. Paul
Hultkrans, Joel C.....St. Paul
Hunt, H. E.....St. Paul
Ide, Arthur W.....St. Paul
Ingerson, C. A.....St. Paul
Jesion, J. W.....St. Paul

Johnson, Asa M.....St. Paul
Johnson, Hartland C.....St. Paul
Johnson, T. H.....St. Paul
Jones, D. C.....St. Paul
Jones, E. M.....St. Paul
Kamman, Gordon R.....St. Paul
Kannary, E. L.....St. Paul
Kelly, John V.....St. Paul
Kelly, Paul H. .....St. Paul
Kennedy, William .....St. Paul
Kenny, H. F.....St. Paul
Kesting, Herman .....St. Paul
Kistler, A. S.....St. Paul
Klein, H. N.....St. Paul
Knauff, M. K.....St. Paul
Kvitrud, G. .....St. Paul
Langenderfer, F. V.....St. Paul
Larsen, C. L.....St. Paul
Larson, M. L.....St. Paul
Leahy, B. .....St. Paul
Leavenworth, R. O.....St. Paul
Leitch, Archibald .....St. Paul
Lepak, John A.....St. Paul
Lerche, William .....St. Paul
Lewis, J. B.....South St. Paul
Lewis, W. W.....St. Paul
Lick, C. L.....St. Paul
Little, W. J.....St. Paul
Lundholm, A. M.....St. Paul
McCarthy, W. R.....St. Paul
McClanahan, J. H.....White Bear
McClanahan, T. S.....White Bear
McCloud, C. N.....St. Paul
McDavitt, Thomas .....St. Paul
McKeon, Owen .....St. Paul
McLaren, Jennette M.....St. Paul
McNevin, C. F.....St. Paul
Maloney, T. J.....St. Paul
Martineau, J. L.....St. Paul
Meyerding, E. A.....St. Paul
Mitchell, Frederick .....St. Paul
Molander, H. A.....St. Paul
Morris, R. Edwin.....St. Paul
Morrissey, F. B.....St. Paul
Mortenson, N. G.....St. Paul
Moss, Myer N.....St. Paul
Moynihan, T. J.....St. Paul
Murphy, E. F.....St. Paul
Myers, Thos. .....St. Paul
Neher, F. H.....St. Paul
Nelson, L. A.....St. Paul
Nesbit, Harold T.....St. Paul
Nichols, A. E.....St. Paul
Nippert, H. T.....St. Paul
Norris, E. H.....St. Paul
Nye, Katherine A.....St. Paul
Nye, Lillian .....St. Paul
O'Brien, H. J.....St. Paul
O'Connor, I. A.....St. Paul
O'Connor, J. P.....St. Paul
O'Connor, J. V.....St. Paul
Oerting, Harry .....St. Paul
Ogden, Warner .....St. Paul
Ohage, Justus .....St. Paul
Ohage, Justus, Jr.....St. Paul
Olson, Chas. A.....St. Paul
Ostergren, E. W.....St. Paul
Pearson, F. R.....St. Paul
Pedersen, A. H.....St. Paul
Perry, C. G.....St. Paul
Peterson, V. N.....St. Paul
Pine, Auten A.....St. Paul
Platt, J. J.....St. Paul
Plondke, F. J.....St. Paul
Ramsey, W. R.....St. Paul
Richards, E. T. F.....St. Paul
Richardson, H. E.....St. Paul
Riggs, C. Eugene.....St. Paul
Ritchie, H. P.....St. Paul
Rogers, John T.....St. Paul
Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Roy, Philemon .....St. Paul
Ruhberg, Geo. N.....St. Paul
Rutherford, W. C.....St. Paul
Ryan, John J.....St. Paul
Satterlund, V. L.....St. Paul
Savage, F. J.....St. Paul
Schatz, F. J.....St. Paul
Schoch, R. B.....St. Paul
Schons, E. .....St. Paul
Schuldt, F. C.....St. Paul
Schulze, Albert G.....St. Paul
Schwyzer, Arnold .....St. Paul
Senkler, G. E.....St. Paul
Shannon, W. R.....St. Paul
Shapere, A. D.....St. Paul
Shellman, John L.....St. Paul
Shillington, M. A.....St. Paul
Shimonek, Anton .....St. Paul
Simon, B. F.....St. Paul
Simon, Geo. H.....St. Paul
Skinner, H. O.....St. Paul
Snyder, Geo. W.....St. Paul
Sohlberg, Olof .....St. Paul
Sprafka, J. M.....St. Paul
Staley, J. C.....St. Paul
Steen, A. H.....Cottage Grove
Sterner, E. G.....St. Paul
Sterner, O. W.....St. Paul
Stevens, F. A.....Lake Elmo
Stewart, Alexander.....St. Paul
Stierle, Adolph .....St. Paul
Stinnette, S. E.....St. Paul
Stolpestad, H. L.....St. Paul
Swanson, Edwin O.....St. Paul
Swanson, John A.....St. Paul
Sweeney, Arthur .....St. Paul
Swendson, J. J.....St. Paul
Taylor, H. L.....St. Paul
Teisberg, C. B.....St. Paul
Thauwald, C. C.....St. Paul
Tiber, L. J.....St. Paul
Tregilgas, H. R.....St. Paul
Van Norman, K. H.....St. Paul
Van Slyke, Chas. A.....St. Paul
Von der Weyer, William..St. Paul
Waas, Chas. .....St. Paul
Wald, R. H.....St. Paul
Walker, R. E.....St. Paul
Wallinga, John H.....St. Paul
Walters, B. Frank.....St. Paul
Warner, E. F.....St. Paul
Warnock, R. W.....St. Paul
Warren, E. L.....St. Paul
Warwick, Margaret .....St. Paul
Welch, M. C.....St. Paul
Wheeler, M. W.....St. Paul
Whitacre, J. C.....St. Paul
Whitcomb, Ed. H.....St. Paul
White, J. S.....St. Paul
Whitmore, F. W.....St. Paul
Whitney, A. W.....St. Paul
Williams, Clayton .....St. Paul
Winnick, J. B.....St. Paul
Wold, K. C.....St. Paul
Wolfe, H. H.....St. Paul
Wood, H. G.....St. Paul
Ylvisaker, L. S.....St. Paul
Zander, C. H.....St. Paul
Zimmerman, H. B.....St. Paul

Washington County Medical Society

Regular meetings held on second Tuesday of the odd numbered months
Annual meeting, November

President
Freligh, E. O'B.....Stillwater
Secretary
Josewski, R. J.....Stillwater
Brown, A. E.....Stillwater

Freligh, E. O'B.....Stillwater
Haines, J. H.....Stillwater
Humphrey, W. R.....Stillwater
Josewski, R. J.....Stillwater
Kalinoff, D. .....Stillwater
Landeen, F. G.....Stillwater
Mingo, F. E.....Hugo

Newman, G. A.....Stillwater
Poirier, J. A.....Forest Lake
Sherman, C. H.....Bayport
Stuhr, J. W.....Stillwater
Thompson, V. C. .....
Marine-on-St. Croix

Chisago-Pine County Medical Society

Regular meetings, second Tuesday in January, May, August and November
Annual meeting, second Tuesday in May

President
Dredge, H. P.....Sandstone
Secretary
Kelsey, C. G.....Hinckley
Bohling, B. S.....Sandstone

Callahan, F. F.....Pokegama
Dredge, H. P.....Sandstone
Flom, A. O.....Chisago City
Gunz, A. W.....Center City
Holmes, A. E.....Rush City
Kelsey, C. G.....Hinckley
Paulson, C. W.....North Branch

Stewart, R. I.....Lindstrom
Stowe, A. J.....Rush City
Stratte, A. K.....Pine City
Tilton, A. J.....Alden
Wiseman, Robert L.....Pine City
Zelen, Thos. .....North Branch

Central Minnesota District Medical Society

Mille Lacs, Sherburne, Isanti, Anoka and Kanabec Counties
Regular meetings, January, May and September
Annual meeting, January

President
Swenson, Charles .....Braham
Secretary
Cooney, H. C.....Princeton
Bossert, C. S.....Mora
Caine, A. T.....Anoka
Caley, G. R.....Princeton

Cooney, H. C.....Princeton
Dunne, Gerald P.....Isle
Gates, C. E.....Anoka
Hall, E. L.....Princeton
Hendenstrom, L. H.....Cambridge
McCann, G. C.....Onamia
Norrgard, H. T.....Milaca
Peterson, A. A.....Mora

Roadman, I. M.....Ponsford
Roehlke, A. B.....Elk River
Shulean, N. S.....Cambridge
Spurzem, R. J.....Anoka
Stocking, F. F.....Milaca
Swennes, O. S.....Wahkon
Swenson, Charles .....Braham
Vrooman, F. E.....St. Francis

St. Louis County Medical Society

St. Louis, Cook, Lake, Itasca and Carlton Counties
Regular meetings, second Thursday of each month
Annual meeting, second Thursday in October

President
Magney, F. H.....Duluth
Secretary
Anderson, H. C.....Duluth

Abbott, Wm. P.....Duluth
Adams, B. S.....Hibbing
Anderson, H. C.....Duluth
Arminen, K. V.....Duluth
Armstrong, E. L.....Duluth
Athens, A. S.....Duluth
Ayers, G. T.....Ely
Bagley, W. R.....Duluth
Barney, L. A.....Duluth
Barrett, Fred .....Gilbert
Berdez, G. L.....Duluth
Bergquist, K. E.....Duluth
Blacklock, S. S.....Hibbing
Blakely, C. C.....Barnum
Boman, P. G.....Duluth
Bowen, R. L.....Hibbing
Boyer, S. H.....Duluth
Braden, A. J.....Duluth
Bradley, E. L.....Duluth
Bray, C. W.....Biwabik
Briggs, F. W.....Duluth
Brunet, L. M..River Rouge, Mich.
Bullen, F. W.....Hibbing
Burns, H. J.....Duluth
Burns, R. L.....Two Harbors
Carstens, C. F.....Hibbing
Chapman, T. L.....Duluth
Cheney, E. L.....Duluth
Christenson, E. P.....Two Harbors
Clark, F. F.....Duluth
Collins, A. N.....Duluth
Collins, H. C.....Duluth
Cosgrove, J. H.....Duluth
Coventry, W. A.....Duluth
Crowe, J. H.....Virginia
Dahlin, I. T.....Coleraine
Daniels, H. A.....Eveleth
Davis, B. F.....Duluth
Davis, H. S.....Duluth
Doolittle, L. E.....Duluth
Doyle, Geo. C.....Duluth
Drenning, F. C.....Duluth
Ecklund, E. C.....Hibbing
Eckman, P. F.....Duluth
Eisenman, W. G.....Chisholm
Ekblad, J. W.....Duluth
Eklund, W. J.....Duluth
Elias, F. J.....Duluth
Empie, W. M.....Virginia
Eppard, R. M.....Cloquet
Ewens, H. B.....Virginia
Ferreira, G. J.....Aurora
Fleming, J. .....Cloquet
Forbes, R. S.....Duluth
Fuerste, Frederick .....Proctor
Gardner, R. D.....Eveleth
Gauthier, W. L.....Virginia
Gendron, J. F.....Grand Rapids
Gibson, A. J.....Duluth
Gilbert, J. D.....Carlton
Gillespie, M. G.....Duluth
Gillespie, N. H.....Duluth
Giroux, A. A.....Duluth
Goodman, C. E.....Virginia
Graham, David .....Duluth
Graham, R. D. .....Duluth
Graham, Robert .....Duluth
Grawn, F. A.....Duluth
Greeley, L. Q.....Duluth
Grover, F. E.....Duluth
Haney, C. L.....Duluth
Harris, C. N.....Nashwauk
Hatch, W. E.....Duluth
Hayes, M. F.....Nashwauk
Heimark, O. E.....Duluth
Hill, F. E.....Duluth
Hirschboeck, F. J.....Duluth
Hirschfield, M. S.....Duluth
Hovde, H. .....Duluth
Hursh, M. M.....Grand Rapids
Jensen, T. J.....Duluth
Kean, N. D.....Coleraine
Keyes, C. R.....Duluth
Kiesling, I. H.....Nashwauk
King, W. S. .....Eveleth
Klein, Harry .....Duluth
Knapp, F. N.....Duluth
Kohlbry, C. O.....Duluth
Kraft, Peter .....Duluth
Kuth, J. R. .....Duluth
Laird, A. T. .....Nopeming
Lenont, C. B. .....Virginia
Lepak, F. J.....Duluth
Lindgren, E. I.....Duluth
Litman, Samuel N..Meadowlands
Loofbourrow, E. H.....Keewatin
Lum, C. E.....Duluth
McComb, C. F.....Duluth
McCoy, Mary .....Duluth
McDonald, A. L.....Duluth
McGiffert, E. N.....Duluth
McHaffie, O. L.....Duluth
McIntyre, E. H.....Virginia
McMurtrie, W. B.....Marble
McMurtry, W. C.....Virginia
McNutt, John R.....Two Harbors
Magie, W. H.....Duluth
Magney, F. H.....Duluth
Manley, J. R.....Duluth
Martin, T. R.....Duluth
Merriman, L. L.....Duluth
Miller, Walter H.....Buhl
Miners, G. A.....Deer River
Monroe, P. B.....Soudan
More, C. W.....Eveleth
Morsman, L. W.....Hibbing
Morss, C. R.....Zumbrota
Murray, D. D.....Duluth
Nelson, E. H.....Chisholm
Nicholson, M. A.....Duluth
Olson, Albert E.....Duluth
Olson, O. S.....Duluth
Oredson, O. A.....Duluth
Pake, S. G.....Duluth
Paradine, J. .....Duluth
Parker, O. W.....Ely
Payette, C. H.....Duluth
Pennie, D. F.....Duluth
Perley, A. E.....Chisholm
Powers, J. E.....Duluth
Raadquist, C. S.....Hibbing
Radtke, H. P.....Chisholm
Raihala, John .....Virginia
Raiter, Franklin W. S.....Cloquet
Raiter, Roy F.....Cloquet
Reynolds, Hugh .....Hibbing
Rippert, J. A.....Duluth
Robinson, J. M.....Duluth
Rood, D. C.....Duluth
Rowe, O. W.....Duluth
Rudie, P. S.....Duluth
Ryan, J. W.....Duluth
Scherer, C. A.....Duluth
Schroeder, C. H.....Duluth
Schwartz, A. H.....Duluth
Seashore, D. E.....Duluth
Shapiro, E. Z.....Duluth
Shaw, A. W.....Buhl
Slyfield, F. F.....Duluth
Smith, C. M.....Duluth
Spicer, F. W.....Duluth
Strathern, M. L.....Gilbert
Strobel, W. G.....Duluth
Stuart, A. B.....Cloquet
Sukeforth, L. A.....Duluth
Sutherland, H. N.....Ely
Tibbetts, M. H.....Duluth
Tilderquist, D. L.....Duluth
Tuohy, E. L.....Duluth
Turnbull, F. M.....Duluth
Urberg, S. E.....Duluth
Vercellini, C. E.....Duluth
Walker, A. E.....Duluth
Walters, F. R.....Moose Lake
Webber, E. E.....Proctor
Webster, H. E.....Duluth
Weirick, Howard R.....Hibbing
Wilkinson, Stella .....Duluth
Winter, J. A.....Duluth
Young, T. O.....Duluth
Young, V. A.....Duluth

FOURTH DISTRICT

COUNCILOR, W. H. CONDIT (3 years).....Minneapolis

Hennepin County Medical Society

Regular meetings, first Monday in each month excepting June, July and August
Annual meeting, first Monday in January

President
Geist, Emil .....Minneapolis
Secretary
La Vake, R. T.....Minneapolis

Abbott, A. W.....Minneapolis
Adair, F. L.....Minneapolis
Aling, C. P.....Minneapolis
Allen, H. W.....Minneapolis
Allison, R. G.....Minneapolis
Almquist, H. E.....Minneapolis
Anderson, A. E.....Minneapolis
Anderson, Arnt .....Minneapolis
Anderson, D. D.....Minneapolis
Anderson, E. D.....Minneapolis
Anderson, Frank J....Minneapolis
Anderson, James K....Deerwood
Annis, H. B.....Minneapolis
Arey, H. C.....Excelsior
Arvidson, C. G.....Minneapolis
Aurand, W. H.....Minneapolis
Aurness, P. A.....Minneapolis
Avery, J. F.....Minneapolis
Aylmer, A. L.....Minneapolis
Baken, Melvin P.....Minneapolis
Baker, A. T.....Minneapolis
Baker, E. L.....Minneapolis
Bakke, O. H.....Minneapolis
Baldwin, L. B.....Minneapolis
Barber, J. P.....Minneapolis
Barden, Norman.....Minneapolis
Barron, Moses .....Minneapolis
Bass, G. W.....Minneapolis
Baxter, S. H.....Minneapolis
Beard, Archie .....Minneapolis
Bedford, E. W.....Minneapolis
Bell, J. W., Jr.....Minneapolis
Bell, J. W., Sr.....Minneapolis
Benedict, E. E.....Minneapolis
Benjamin, A. E.....Minneapolis
Benn, F. G.....Minneapolis
Benson, R. D.....Minneapolis
Bessesen, A. N.....Minneapolis
Bessesen, Al. N., Jr...Minneapolis
Bessesen, Daniel H...Minneapolis
Bessesen, Wm. A.....Minneapolis
Bishop, Chas. W.....Minneapolis
Bissell, F. S.....Minneapolis
Blake, James .....Hopkins
Blaustone, H. H.....Minneapolis
Blanton, Smiley .....Minneapolis
Bockman, M. W. H...Minneapolis
Booth, A. E.....Minneapolis
Boquist, E. T. W.....Minneapolis
Boreen, C. A.....Minneapolis
Bouman, H. A. H.....Minneapolis
Bracken, H. M.....Minneapolis
Bratrud, Arthur F....Minneapolis
Brooks, Chas. N.....Minneapolis
Brown, E. J.....Minneapolis
Brown, E. D.....Minneapolis
Brown, R. S.....Minneapolis
Bulkley, Kenneth ....Minneapolis
Butler, John .....Minneapolis
Byrnes, W. J.....Minneapolis

Cabot, V. S.....Minneapolis
Camp, Walter E.....Minneapolis
Campbell, Lowell M..Minneapolis
Campbell, Robert ....Minneapolis
Carey, Jas. B.....Minneapolis
Carlaw, Chester M...Minneapolis
Cheleen, S. J.....Minneapolis
Cirkler, A. A.....Minneapolis
Clark, Howard S....Minneapolis
Condit, W. H.....Minneapolis
Cook, H. W.....Minneapolis
Corbett, J. Frank....Minneapolis
Cosman, E. O.....Minneapolis
Crafts, L. M.....Minneapolis
Cranmer, Richard R..Minneapolis
Cross, John G.....Minneapolis
Crume, Geo. P.....Minneapolis
Curtin, John F.....Minneapolis
Cutts, Geo. .....Minneapolis
Dahl, Elmer O.....Minneapolis
Dahl, John A.....Minneapolis
Dahlstrom, A. W.....Minneapolis
Daniel, Donald H....Minneapolis
Dart, L. O.....Minneapolis
Dezell, Earl R.....Minneapolis
Deziel, G. .....Minneapolis
Diehl, Harold S.....Minneapolis
Diessner, H. D.....Minneapolis
Disen, C. F.....Minneapolis
Doctor, Wm. R.....Minneapolis
Donaldson, C. A.....Minneapolis
Dorge, Richard .....Minneapolis
Dornblaser, H. Bright..Minneapolis
Doxey, G. L.....Minneapolis
Drake, Chas. R.....Minneapolis
Dreisbach, N. .....Minneapolis
Dumas, Alex G.....Minneapolis
Dunn, Geo. Robt.....Minneapolis
Dunn, Louis .....Minneapolis
Dunsmoor, F. A.....Minneapolis
Dutton, C. E.....Minneapolis
Egilsrud, Kristian ...Minneapolis
Ehrenberg, C. J.....Minneapolis
Eisler, Edw. R.....Minneapolis
Eitel, G. G.....Minneapolis
Ellison, D. E.....Minneapolis
Erb, Fred A.....Minneapolis
Ericson, John G.....Minneapolis
Everlof, J. L.....Minneapolis
Fansler, W. A.....Minneapolis
Farr, R. E.....Minneapolis
Feidt, W. W.....Minneapolis
Fischer, G. .....Minneapolis
Fjelstad, C. Alford...Minneapolis
Fjellman, R. C.....Minneapolis
Fleming, A. S.....Minneapolis
Fleming, C. Filmore..Minneapolis
Flocken, Chas. F....Minneapolis
Fowler, L. Haynes...Minneapolis
Fox, John M.....Minneapolis
Frazen, H. G.....Minneapolis
Gammell, J. H.....Minneapolis
Gardner, E. L.....Minneapolis
Geist, Emil .....Minneapolis
Giessler, Paul W.....Minneapolis
Gilles, F. L.....Minneapolis
Gordon, G. J.....Minneapolis
Gosin, D. F.....Minneapolis
Goss, Harold L.....Minneapolis
Grave, Floyd .....Minneapolis
Green, E. K.....Minneapolis
Groll, S. .....Minneapolis
Gunderson, Harley J..Minneapolis
Gunderson, Nels A...Minneapolis
Hacking, Frank .....Minneapolis
Hagen, G. L.....Minneapolis
Haggard, G. D.....Minneapolis
Hall, J. M.....Minneapolis
Hamel, Arnold L.....Minneapolis
Hamel, C. E.....Minneapolis
Hamilton, A. S.....Minneapolis
Hamlin, Geo. B.....Minneapolis
Hammond, A. J.....Minneapolis
Hansen, Elmer H.....Minneapolis
Hansen, Erling .....Minneapolis
Hansen, Olga .....Minneapolis
Hanson, H. J.....Minneapolis
Hare, E. R.....Minneapolis
Harrington, C. D....Minneapolis
Harrington, F. E....Minneapolis
Hartzell, Thos. B....Minneapolis
Haverfield, Addie R...Minneapolis
Hayes, J. M.....Minneapolis
Head, G. D.....Minneapolis
Hearn, Wm. O.....Minneapolis
Hedback, A. E.....Minneapolis
Hedding, J. A.....Minneapolis
Heim, R. R.....Minneapolis
Helk, H. H.....Minneapolis
Hendrickson, J. F....Minneapolis
Henry, C. E.....Minneapolis
Henry, Myron O.....Minneapolis

Herbst, Wm. P.....Minneapolis
Herman, Arthur L....Minneapolis
Hiebert, J. P.....Minneapolis
Higgins, J. H.....Minneapolis
Hill, Eleanor J.....Minneapolis
Hirschfield, F. R.....Minneapolis
Hoaglund, Arthur W..Minneapolis
Hobbs, C. A.....Minneapolis
Hodge, S. V.....Minneapolis
Hoiland, A. S.....Minneapolis
Holen, T. .....Minneapolis
Holm, Geo. A.....Minneapolis
Howard, Wm. H.....Minneapolis
Huenekens, E. J.....Minneapolis
Hughes, L. D.....Minneapolis
Hynes, James .....Minneapolis
Hynes, John E.....Minneapolis
Ikeda, Kano .....Minneapolis
Irvine, H. G.....Minneapolis
Jennings, Mary H....Minneapolis
Jensen, M. J.....Minneapolis
Joannides, Minas ....Minneapolis
Johnson, A. E.....Minneapolis
Johnson, A. Elof.....Minneapolis
Johnson, James A.....Minneapolis
Johnson, Julius .....Minneapolis
Johnson, Nimrod A....Minneapolis
Johnson, Odin J.....Minneapolis
Johnson, R. A.....Minneapolis
Jones, H. W.....Minneapolis
Jones, W. A.....Minneapolis
Josewich, Alex. .....Minneapolis
Kennedy, C. C.....Minneapolis
Kennedy, Jane F.....Minneapolis
Kennedy, R. R.....Minneapolis
Kimball, H. H.....Minneapolis
King, E. A.....Minneapolis
King, W. R.....Minneapolis
Kistler, C. M.....Minneapolis
Kittelson, Olaf .....Minneapolis
Knight, H. L.....Minneapolis
Knight, R. R.....Minneapolis
Knight, Ralph T.....Minneapolis
Koch, John C.....Minneapolis
Kohler, Geo. A.....Minneapolis
Koller, H. M.....Minneapolis
Koller, L. R.....Minneapolis
Kremer, Walter J.....Minneapolis
Kriedt, Daniel .....Minneapolis
Kucera, Wm. J.....Minneapolis
Kusske, A. L.....New Ulm
Lajoie, J. M.....Minneapolis
Lane, Laura A.....Rochester
Lapierre, C. A.....Minneapolis
Laurent, A. A.....Minneapolis
La Vake, R. T.....Minneapolis
Law, A. A.....Minneapolis
Leavitt, H. H.....Minneapolis
Lebowske, Jos. A.....Minneapolis
Lee, H. M.....Minneapolis
Lee, John W.....Minneapolis
Leland, M. N.....Minneapolis
Lemstrom, Jarl .....Minneapolis
Leonard, L. J.....Minneapolis
Lind, C. J.....Minneapolis
Lippman, H. S.....Minneapolis
List, Walter E.....Minneapolis
Litchfield, John .....Minneapolis
Litzenberg, J. C.....Minneapolis
Logefeil, Rudolph ....Minneapolis
Long, Jesse .....Minneapolis
Loomis, E. A.....Minneapolis
Lundgren, A. C.....Minneapolis
Lynch, M. J.....Minneapolis
Lyng, John .....Minneapolis
Lysne, Henry .....Minneapolis
McCarthy, Donald ....Minneapolis
McCartney, Jas. S....Minneapolis
McDaniel, Oriana ....Minneapolis
McEachran, A. .....Minneapolis
McFarland, Arthur H..Minneapolis
McGandy, R. F.....Minneapolis
McIntyre, George ....Minneapolis
McKinlay, C. A.....Minneapolis
McKinley, J. C.....Minneapolis
McKinney, F. S.....Minneapolis
McLaughlin, Jas. A...Minneapolis
McPheeters, H. O.....Minneapolis
MacDonald, A. E.....Minneapolis
MacDonald, D. A.....Minneapolis
MacDonald, I. C.....Minneapolis
Macnie, John .....Minneapolis
Maland, C. O.....Minneapolis
Mann, A. T.....Minneapolis
Marcley, W. J.....Minneapolis
Mariette, E. .....Oak Terrace
Mark, D. B.....Minneapolis
Matchan, Glen R.....Minneapolis
Matthews, Justus ....Minneapolis
Maxeiner, Stanley R..Minneapolis
May, W. H.....Minneapolis
Mead, Marion A.....Minneapolis

Merkert, Chas. E.....Minneapolis
Merkert, G. L.....Minneapolis
Meyer, E. L.....Minneapolis
Michael, J. C.....Minneapolis
Michelson, H. E.....Minneapolis
Miller, F. C.....Minneapolis
Moir, Wm. W.....Minneapolis
Moorhead, M. B.....Minneapolis
Moren, Edwin .....Minneapolis
Moriarity, Cecile R...Minneapolis
Morrison, A. W.....Minneapolis
Morse, John H.....Minneapolis
Morton, H. McI.....Minneapolis
Murphy, I. J.....Minneapolis
Murray, Wm. R.....Minneapolis
Myers, J. A.....Minneapolis
Nathanson, M. H.....Minneapolis
Neal, J. M.....Minneapolis
Nelson, C. P.....Owatonna
Nelson, H. S.....Minneapolis
Nelson, O. E.....Minneapolis
Newhart, Horace ....Minneapolis
Nippert, L. A.....Minneapolis
Noonan, Dan F.....Minneapolis
Nootnagel, C. F.....Minneapolis
Noran, A. N.....Minneapolis
Nordin, G. T.....Minneapolis
Nordland, Martin ....Minneapolis
Noth, H. W.....Minneapolis
Oberg, C. M.....Minneapolis
O'Donnell, J. E.....Minneapolis
Olson, Frederick A...Minneapolis
Olson, G. M.....Minneapolis
Olson, Olaf A.....Minneapolis
Olson, R. G.....Minneapolis
Owre, Oscar .....Minneapolis
Parks, A. H.....Minneapolis
Patterson, W. E.....Minneapolis
Paulsen, E. L.....Minneapolis
Pearce, N. O.....Minneapolis
Pederson, Harold ....Minneapolis
Pederson, R. M.....Minneapolis
Peppard, T. A.....Minneapolis
Perry, Ralph St. John..Minneapolis
Peters, R. M.....Minneapolis
Petersen, J. R.....Minneapolis
Petersen, Thorvald ...Minneapolis
Peterson, O. H.....Minneapolis
Peterson, Willard C...Minneapolis
Pettit, C. W.....Minneapolis
Peyton, Wm. T.....Minneapolis
Phelps, Kenneth A....Minneapolis
Pineo, W. B.....Minneapolis
Platou, Erling S.....Minneapolis
Poehler, F. T.....Minneapolis
Poppe, F. H.....Minneapolis
Pratt, Fred J.....Minneapolis
Pratt, J. A.....Minneapolis
Preine, Irving A.....Minneapolis
Prim, J. A.....Minneapolis
Prohek, C. E.....Minneapolis
Quinby, Thos. F.....Minneapolis
Quist, Henry W.....Minneapolis
Reed, Charles A.....Minneapolis
Rees, S. P.....Minneapolis
Regnier, E. A.....Minneapolis
Reinertson, B. R.....Buffalo, S. D.
Reynolds, J. S.....Minneapolis
Richdorf, L. F.....Minneapolis
Rigler, Leo G.....Minneapolis
Rishmiller, J. H.....Minneapolis
Rizer, R. I.....Minneapolis
Roan, Carl M.....Minneapolis
Robb, Edw. F.....Minneapolis
Roberts, Thos. S.....Minneapolis
Roberts, W. B.....Minneapolis
Robitshek, E. C.....Minneapolis
Rochford, W. E.....Minneapolis
Rodda, F. C.....Minneapolis
Rodgers, C. L.....Minneapolis
Rosen, S. .....Minneapolis
Rosenwald, R. M.....Minneapolis
Rowe, Paul H.....Minneapolis
Rudd, Henry O.....Minneapolis
Rudell, G. .....Minneapolis
Runnerstrom, Geo. E..Minneapolis
Sawatzky, Wm. A.....Minneapolis
Schaaf, Fred K.....Minneapolis
Schefcik, J. F.....Minneapolis
Scheldrup, N. H.....Minneapolis
Schlutz, F. W.....Minneapolis
Schmidt, Geo. F.....Minneapolis
Schmitt, Aaron F.....Minneapolis
Schmitt, S. C.....Minneapolis
Schneider, J. P.....Minneapolis
Schussler, Otto F.....Minneapolis
Schwartz, Virgil J.....Minneapolis
Schwyzer, G. .....Minneapolis
Seaberg, J. A.....Minneapolis
Seashore, Gilbert ....Minneapolis
Seham, Max .....Minneapolis
Selleseth, Iver F.....Minneapolis

Sessions, J. C.....Minneapolis
Simons, J. H.....Minneapolis
Simpson, E. D.....Minneapolis
Simpson, J. D.....Minneapolis
Sivertsen, Andrew ...Minneapolis
Sivertsen, Ivar .....Minneapolis
Slocumb, Maude .....Minneapolis
Smith, Adam M.....Minneapolis
Smith, Homer R.....Minneapolis
Smith, Norman M.....Minneapolis
Soderlind, A. .....Minneapolis
Solhaug, S. B.....Minneapolis
Souba, Fred J.....Minneapolis
Spratt, C. N.....Minneapolis
Staples, H. L.....Minneapolis
Stewart, C. A.....Minneapolis
Stomel, Joseph .....Minneapolis
Strachauer, A. C.....Minneapolis
Strout, E. S.....Minneapolis
Strout, G. Elmer.....Minneapolis
Stuhr, Henry C.....Minneapolis
Sundt, M. .....Minneapolis
Swanson, Roy E.....Minneapolis
Sweetser, H. B., Sr....Minneapolis
Sweetser, H. B., Jr....Minneapolis
Sweetser, Theo. .....Minneapolis

Sweitzer, S. E.....Minneapolis
Swendseen, Carl G....Minneapolis
Taft, J. O.....Minneapolis
Taft, Walter L.....Minneapolis
Tanner, Alvin C.....Minneapolis
Taylor, Rood .....Minneapolis
Tennyson, Theo. .....Minneapolis
Thomas, Geo. E.....Minneapolis
Thomas, Geo. H.....Minneapolis
Thomas, Gilbert J.....Minneapolis
Tingdale, A. C.....Minneapolis
Towers, F. E.....Minneapolis
Tunstead, Hugh J.....Minneapolis
Turnacliff, D. D.....Minneapolis
Tyrrell, C. C.....Minneapolis
Ulrich, Henry L.....Minneapolis
Undine, Clyde A.....Minneapolis
Voyer, Emile O.....Minneapolis
Waldron, Carl W.....Minneapolis
Wanous, E. Z.....Minneapolis
Ward, A. W.....Minneapolis
Ward, Percy .....Minneapolis
Warham, T. T.....Minneapolis
Watson, C. W.....Minneapolis
Watson, J. A.....Minneapolis
Webb, R. C.....Minneapolis

Weisman, Sam .....Minneapolis
Welles, H. J.....Minneapolis
Wethall, A. G.....Minneapolis
Weum, T. W.....Minneapolis
Whetstone, Mary ....Minneapolis
White, S. Marx.....Minneapolis
Widen, W. F.....Minneapolis
Wilcox, Archa E.....Minneapolis
Wilcox, M. Russell...Minneapolis
Wilicutt, Clarence ...Minneapolis
Williams, Robert .....Minneapolis
Willson, Hugh S.....Minneapolis
Witham, C. A.....Minneapolis
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wood, Douglas F.....Minneapolis
Woodard, F. R.....Minneapolis
Woodworth, Elizab....Minneapolis
Wright, C. B.....Minneapolis
Wright, C. D.....Minneapolis
Wright, F. R.....Minneapolis
Wynne, H. M. N.....Minneapolis
Yoerg, O. W.....Minneapolis
Zaworski, E. A.....Minneapolis
Zierold, A. A.....Minneapolis
Ziskin, Thos. .....Minneapolis

Wright County Medical Society

Regular meetings, first Tuesday after first Monday quarterly
Annual meeting, October

President
Freed, O. J. R.....Cokato
Secretary
Catlin, John J.....Buffalo

Catlin, John J.....Buffalo
Catlin, T. J.....Buffalo
Ellison, Frank .....Monticello

Freed, O. J. R.....Cokato
Harriman, L. .....Howard Lake
Hawkins, E. P.....Montrose
Klaveness, E. .....Monticello
Lee, J. L.....Watertown
Moffatt, A. G.....Howard Lake
Norris, G. H.....Annandale
Peterson, O. L.....Cokato

Phillips, A. E.....Delano
Ridgway, A. M.....Annandale
Roholt, C. L.....Waverly
Rousseau, Victor .....Maple Lake
Shrader, E. E.....Watertown
Sturges, C. J.....Buffalo
Swezey, B. F.....Buffalo
Thoresen, Th. ....Brooklyn, N. Y.

Meeker County Medical Society

Regular meetings, quarterly, May 15, August 15, October 15
Annual meeting, December 15

President
Brigham, Frank .....Watkins
Secretary
Danielson, K. A.....Litchfield

Brigham, Frank .....Watkins
Cutts, G. A. C.....Litchfield
Danielson, K. A.....Litchfield
Dulude, S. .....Dassel
Lyman, F. V.....Grove City
O'Connor, D. C.....Eden Valley

Peterson, Alfred .....Dassel
Robertson, A. W.....Litchfield
Robertson, W. P.....Litchfield
Sturre, J. R.....Watkins
Wilmot, H. E.....Litchfield

Stearns-Benton County Medical Society

Regular meetings, third Thursday in January, April, July and October
Annual meeting, third Thursday in April

President
Lewis, C. B.....St. Cloud
Secretary
Libert, J. N.....St. Cloud

Ausman, C. F.....Paynesville
Adams, J. W.....Waite Park
Adams, L. P.....Sauk Rapids
Beaty, James H.....St. Cloud
Boehm, John C.....St. Cloud
Bowing, I. E.....St. Cloud
Brigham, C. F.....St. Cloud
Clark, Harry B.....St. Cloud
Du Bois, Julian A....Sauk Center
Du Bois, Julian F....Sauk Center
Fleming, T. N.....St. Cloud

Freeman, W. L.....St. Cloud
Friesleben, Wm. .....Sauk Center
Gelz, J. .....St. Cloud
Goehrs, H. W.....St. Cloud
Gulde, W. C.....St. Cloud
Haberman, E. .....Osakis
Hemstead, Werner .....St. Cloud
Holdridge, G. A.....Foley
Jones, R. N.....Richmond
Kern, M. J.....St. Cloud
Kingsbury, E. M.....Clearwater
Kohler, D. W.....St. Joseph
Kuhlman, Aug. .....Melrose
Lewis, E. J.....St. Cloud
Lewis, C. B.....St. Cloud
Libert, J. N.....St. Cloud
McDowell, J. P.....St. Cloud
McKibben, H. E.....St. Cloud

Meyer, A. A.....Melrose
Moynihan, And. F....Sauk Center
Pfaff, E. K.....Shoals, Ind.
Pilon, P. C.....Paynesville
Putney, George E.....Paynesville
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Rice, G. D.....St. Cloud
Richardson, Fred S.....Belgrade
Ridgeway, Alex. .....Belgrade
Sherwood, G. E.....Kimball
Stangl, Fred .....St. Cloud
Stangl, P. E.....St. Cloud
Sutton, Chas. S.....St. Cloud
Sweetman, R. H.....Sauk Center
Townsend, D. .....Brooten
Watson, Tolbert .....Albany
Wolner, Oscar H.....Gilbert

Kandiyohi-Swift County Medical Society

Regular meetings, quarterly, as called by the President
Annual meeting, December

President
Hodapp, R. J.....Willmar
Secretary
Scofield, C. L.....Benson

Anderson, R. E.....Atwater
Branton, A. F.....Willmar

Branton, B. J.....Willmar
Daignault, O. .....Benson
Davison, P. C.....Willmar
Dowswell, W. J.....Benson
Fiksdal, M. J.....Willmar
Freeman, G. E.....Willmar
French, H. S.....New London

Frost, E. H.....Willmar
Hodapp, J. R.....Willmar
Jacobs, Jno. C.....Willmar
Kaufman, Wm. .....Appleton
Kolset, Carl D.....Sanborn
Rains, John M.....Willmar
Scofield, C. L.....Benson

FIFTH DISTRICT

COUNCILOR, H. M. WORKMAN (1 year).....Tracy

Camp Release District Medical Society

Renville, Chippewa, Lac Qui Parle, Yellow Medicine and Sibley Counties

Regular meetings, quarterly
Annual meeting, October

President
Smith, L. G.....Montevideo

Secretary
Holmberg, L. J.....Canby

Adams, R. C.....Bird Island
Aldrich, F. H.....Belview
Barfield, J. J.....Granite Falls
Bergh, L. N.....Montevideo
Brand, W. A.....Redwood Falls
Burns, M. A.....Milan
Bushey, M. E.....Arlington
Clay, E. M.....Renville
Cole, H. B.....Redwood Falls
Crandall, A. M.....Madison
Cress, E. E.....Boyd
Eisengraeber, G. A....Los Angeles
Flinn, B. P.....Redwood Falls
Flinn, T. E.....Redwood Falls
Flower, W. Z.....Minneapolis
Frisch, Frank P.....New York
Gaines, E. C.....Buffalo Lake
Guyer, L. G.....Nopeming
Hassett, Roger G.....Bird Island
Holmberg, L. J.....Canby
Johnson, C. M.....Dawson
Johnson, H. M.....Dawson
Kaufman, A. J.....Franklin
Kilbride, J. S.....Canby
Lee, W. N.....Madison
Lima, Ludvig .....Montevideo
Mee, P. H.....Osseo
Mesker, G. H.....Olivia
Mitchell, A. B.....Hector
Olson, W. P.....Gaylord
Passer, A. A.....Olivia
Penhall, F. W.....Morton
Peterson, H. E.....Granite Falls
Puffer, F. L.....Bird Island
Sanderson, A. G.....Granite Falls
Sherman, H. T.....Franklin
Smith, L. G.....Montevideo
Stemsrud, A. A.....Dawson
Walker, G. H.....Austria
Westby, N. .....Madison
Zimbeck, R. D.....Maynard

Redwood-Brown County Medical Society

Annual meeting, April

President
Hammermeister, Theo. F.....
New Ulm

Secretary
Meierding, Wm. A.....Springfield

Adams, J. L.....Morgan
Dubbe, F. H.....New Ulm
Eckstein, A. W.....Comfrey
Fritsche, A. .....New Ulm
Fritsche, L. A.....New Ulm
Gray, F. D.....Marshall
Hammermeister, Theo. F.....
New Ulm
Jamieson, Earl ....Walnut Grove
Kiefer, M. A.....Sleepy Eye
Meierding, Wm. A.....Springfield
Pederson, O. J.....Hanska
Peterson, R. A.....Vesta
Reinecke, George F.....New Ulm
Rothenburg, J. C.....Springfield
Schoch, J. L.....New Ulm
Seifert, Otto J.....New Ulm
Shrader, J. S.....Springfield
Strickler, A. F.....Sleepy Eye
Strickler, Mary .....Sleepy Eye
Strickler, O. C.....New Ulm
Vogel, Jos. H.....New Ulm
Vogtel, M. A.....Minneapolis
Walker, C. C.....Lamberton
Weiser, Geo. B.....New Ulm
Wellcome, J. W. B....Sleepy Eye

Lyon-Lincoln County Medical Society

Regular meetings, May and July
Annual meeting, October

President
Jacquot, G. L.....Tyler

Secretary
Workman, H. M.....Tracy

Akester, Ward .....Marshall
Bossingham, O. N....Lake Benton
Engh, Sigfred .....Cottonwood
Ford, Burton C.....Marshall
Germo, Chas. .....Balaton
Hoidale, A. D.....Tracy
Jacobsen, David J.....Russell
Jacquot, G. L.....Tyler
Jensen, J. C.....Hendricks
Persons, C. E.....Marshall
Robertson, J. B.....Cottonwood
Sanderson, E. T.....Minneota
Thordarson, Theo. .....Minneota
Vadheim, A. L.....Tyler
Valentine, W. H.....Tracy
Workman, H. M.....Tracy
Workman, W. G.....Tracy

SIXTH DISTRICT

COUNCILOR, F. R. WEISER (2 years).....Windom

Southwestern Minnesota Medical Society

Pipestone, Rock, Murray, Nobles, Cottonwood and Jackson Counties

Regular meetings, May and November
Annual meeting, November

President
Hilger, J. M.....Iona

Secretary
McKeown, E. G.....Pipestone

Arnold, E. W.....Adrian
Atkins, G. L.....Jackson
Basinger, Harvey R.....
Mountain Lake
Benjamin, W. G.....Pipestone
Bong, J. H.....Jasper
Brown, A. H.....Pipestone
Chadbourn, A. G.....Heron Lake
Cress, P. J.....Ellsworth
De Boer, Herman.....Edgerton
Ditmeier, L. M. Gerber....Jasper
Dolan, C. P.....Worthington
Doms, H. C.....Slayton
Doms, Wm. .....Woodstock
Dudley, J. H.....Windom
Golden, C. M.....Tyler
Halloran, Walter .....Jackson
Hilger, J. M.....Iona
Hitchings, W. S.....Lakefield
Johnson, Ellsworth .....Windom
Keeling, F. L.....Lakefield
Kooiker, H. J.....Hills
Knudtson, H. M.....Browerville
Leebens, J. H.....Lismore
Lowe, Thos. .....Pipestone
McCrea, Jas. .....Fulda
McKeown, E. G.....Pipestone
Manson, F. M.....Worthington
May, C. C.....Adrian
Metcalf, F. W.....Fulda
Mork, B. O.....Worthington
Nusbaum, W. H...Storm Lake, Ia.
Patterson, W. E.....Westbrook
Piper, Wm. A.....Mountain Lake
Portman, W. C.....Jackson
Richardson, W. E.....Pipestone
Richmond, Chas. D.....Jeffers
Rose, J. T.....Lakefield
Sherman, C. L.....Luverne
Slater, S. A.....Worthington
Smallwood, J. T.....Worthington
Sogge, L. .....Windom
Stanley, C. R.....Worthington
Taylor, Wm. J.....Pipestone
Thorson, E. O.....Luverne
Tiedeman, I. D.....Heron Lake
Tofte, Josephine .....Fisher
Waller, Jas. D.....Wilmont
Watson, F. G.....Worthington
Weiser, F. R.....Windom
Williams, A. B.....Worthington
Williams, L. A.....Slayton
Wright, C. O.....Luverne

Blue Earth Valley Medical Society

Martin and Faribault Counties

Regular meetings, set by Program Committee

Annual meeting, fourth Thursday in May

President
Gough, W. H.....Granada

Secretary
Hunt, R. C.....Fairmont

Bailey, H. B.....Ceylon
Best, F. E.....Wells
Boysen, H. .....Truman
Broberg, J. A.....Blue Earth
Butz, J. A.....Monterey
Chambers, W. C.....Blue Earth
Cooper, M. D.....Winnebago
Farrish, R. C.....Sherburn
Gough, W. H.....Granada
Henderson, A. J.....Kiester
Holm, P. .....Wells
Herman, S. .....Welcome
Hunt, F. N.....Fairmont
Hunt, R. C.....Fairmont
Hunte, A. F.....Truman
Jacobs, A. C.....Elmore
Johnson, H. P.....Fairmont
Logan, F. W.....Blue Earth
Luedtke, G. H.....Fairmont
McGroarty, J. J.....Easton
Mills, J. W.....Winnebago City
Richardson, W. J.....Fairmont
Silvernail, F. .....Elmore
Sybilrud, H. W.....Bricelyn
Wilson, C. E.....Blue Earth

Wantonwan County Medical Society

Regular meetings, on call

Annual meeting, first week in December

President
Thompson, Albert .....St. James

Secretary
Grimes, H. B.....Madelia

Bregel, F. L.....St. James
Grimes, H. B.....Madelia
Hagen, O. E.....Butterfield
McCarthy, W. J.....Madelia
Ternstrom, O. H.....Minneapolis
Thompson, Albert .....St. James

SEVENTH DISTRICT

COUNCILOR, F. A. DODGE, M.D. (3 years).....Le Sueur

Nicollet-Le Sueur County Medical Society

Regular meetings, June, September and December

Annual meting, December

President
Ericson, Swan .....Le Sueur

Secretary
Baskett, George T.....St. Peter

Aitkens, H. B.....Le Sueur Center
Baskett, Geo. T.....St. Peter
Baskett, Olive T.....St. Peter
Behmler, Fred W.....Appleton
Covell, W. W.....St. Peter
Daniels, J. W.....St. Peter
Dodge, F. A.....Le Sueur
Ericson, S. .....Le Sueur
Fisher, J. M.....St. Peter
Le Clerc, J. E.....Le Sueur
McDougald, D. W.....Minneapolis
Meilicke, W. A.....Nicollet
Phelps, R. M.....St. Peter
Smith, B. F.....St. Peter
Strathern, F. P.....St. Peter
Woodworth, L. F. Le Sueur Center

McLeod County Medical Society

Regular meetings, quarterly

Annual meeting, January

President
Schmidt, W. R.....Glencoe

Secretary
Axilrod, D. L.....Hutchinson

Axilrod, D. L.....Hutchinson
Bolles, D. W.....Long Beach, Cal.
Clair, J. B.....Winsted
Clement, J. B.....Lester Prairie
Holm, H. H.....Glencoe
Jellison, E. R.....New Auburn
Klima, W. W.....Stewart
Kohler, F. G.....Minneapolis
Langhoff, A. H.....Glencoe
Saar, W. G.....Hutchinson
Schmidt, W. R.....Glencoe
Scholpp, O. W.....Hutchinson
Sheppard, Fred .....Huchinson
Sheppard, P. E.....Hutchinson

Scott-Carver Medical Society

Regular meetings, first Thursday in March, June, September and December

Annual meting, first Thursday in December

President
Bohland, F. J. von...Belle Plaine

Secretary
Reiter, H. W.....Shakopee

Bohland, F. J. von...Belle Plaine
Buck, Fred H.....Shakopee
Fischer, H. P.....Shakopee
Fischer, P. M.....Shakopee
Hebeisen, M. B.....Carver
Henriksen, H. G.....Elko
Juergens, H. M.....Belle Plaine
McKeon, James .....St. Paul
Maertz, W. F.....New Prague
Meyer, P. S.....Belle Plaine
Moloney, G. R.....Belle Plaine
Morris, F. J.....Prior Lake
Novak, Edw. E.....New Prague
Phillips, Wm. H.....Jordan
Reiter, H. W.....Shakopee
Schneider, H. A.....Jordan

Goodhue County Medical Society

Annual meeting, first Tuesday in January

President
Werner, N. L.....Red Wing

Secretary
Smith, M. W.....Red Wing

Aanes, A. M.....Red Wing
Anderson, J. V.....Red Wing
Anderson, S. H.....Red Wing
Bjorgo, C. W.....Cannon Falls
Claydon, L. E.....Red Wing
Conley, Alva .....Cannon Falls
Cremer, M. H.....Red Wing
Cremer, P. H.....Hastings
Gausemel, S. D.....Goodhue
Johnson, A. E.....Red Wing
Jones, A. W.....Red Wing
Kretschmar, K. E.....Los Angeles
McGuigan, H. T.....Red Wing
Sawyer, H. P.....Goodhue
Smith, M. W.....Red Wing
Steffens, L. A.....Red Wing
Werner, N. L.....Red Wing

Rice County Medical Society

Regular meetings quarterly, as called
Annual meeting, December

President
Robilliard, W. H.....Faribault
Secretary
Traeger, C. A.....Faribault

Babcock, F. M.....Northfield
Beede, Ethel .....Faribault
Davis, F. U.....Faribault
Field, Merton .....Northfield
Haessly, S. B.....Faribault
Hanson, A. M.....Faribault
Haskins, J. L.....Northfield
Huxley, F. R.....Faribault
Kanne, C. W.....Faribault
Lee, W. P.....Northfield
Lexa, F. J.....Lonsdale
McBroom, D. E.....Faribault
Mayland, M. L.....Faribault
Morse, W. E. H.....Morristown
Moses, Joseph, Jr.....Northfield
Plonske, C. J.....Faribault
Robilliard, C. M.....Faribault
Robilliard, W. H.....Faribault
Rumpf, C. W.....Faribault
Rumpf, W. H.....Faribault
Smith, P. A.....Faribault
Theissen, W. N.....Faribault
Traeger, C. A.....Faribault
Warren, F. S.....Faribault
Warren, J. W.....Faribault
Wilson, Warren .....Northfield
Wilson, W. E.....Northfield

Wabasha County Medical Society

Annual meeting, first Thursday after first Monday in July

President
Bowers, H. E.....Lake City
Secretary
Wilson, W. F.....Lake City

Bayley, E. H.....Lake City
Bowers, H. E.....Lake City
Cochrane, W. J.....Lake City
Dempsey, D. P.....Kellogg
Fleischhauer, D. S.....Wabasha
French, E. A.....Plainview
Gutsell, R. S.....Zumbro Falls
Radabaugh, R. C.....Hastings
Replogle, W. H.....Wabasha
Slocumb, J. A.....Plainview
Sutton, L. F.....Mazeppa
Wilson, W. F.....Lake City

EIGHTH DISTRICT

COUNCILOR, W. F. BRAASCH, M.D. (2 years).....Rochester

Blue Earth County Medical Society

Regular meetings, last Monday in each month
Annual meeting, last Monday in December

President
Kelly, T. C.....Mankato
Secretary
Stillwell, W. C.....Mankato

Andrews, John W.....Mankato
Andrews, Roy N.....Mankato
Arnold, James E...Vernon Center
Benham, Edward W.....Mankato
Black, William .....Mankato
Cosgriff, J. A.....Mankato
Dahl, Gerhard A.....Mankato
Denman, Austin V.....Mankato
Edwards, Ralph T.....Elysian
Franchere, Fred W...Lake Crystal
Fugina, Geo. R.....Mankato
Hielscher, Helen H.....Mankato
Hielscher, Julian A.....Mankato
Holbrook, John S.....Mankato
Holman, Carl J.....Mankato
James, John H.....Mankato
Kelly, Thos. C.....Mankato
Kemp, Alphonse F.....Mankato
Liedloff, Adolph G.....Mankato
Lloyd, Hiram J.....Mankato
Merrill, James E.....Amboy
Miller, Victor .....Mankato
O'Connor, Patrick H.....Amboy
Osborn, Lida .....Mankato
Schlesselman, George .....Good Thunder
Schlesselman, J. T.....Mankato
Schmidt, Paul A.....Mapleton
Sohmer, Alphonse E. J...Mankato
Stillwell, W. C.....Mankato
Wentworth, Albert J.....Mankato
Williams, Hugh O....Lake Crystal

Houston-Fillmore County Medical Society

Regular meetings, May, August and October
Annual meeting, October

President
Eby, Cyrus B.....Spring Valley
Secretary
Fischer, O. F.....Houston

Anderson, Norman E....Harmony
Browning, W. E.....Caledonia
Christianson, H. W.....Wykoff
Clifton, Theo. A.....Chatfield
Collins, J. S.....Wabasha
Drake, F. A.....Lanesboro
Eby, Cyrus B.....Spring Valley
Fischer, O. F.....Houston
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Kibbe, O. A.....Canton
Kierland, P. E.....Alexandria
Lannin, J. C.....Mabel
Love, Geo. A.....Preston
Nannestad, R. F.....Lanesboro
Nass, H. A.....Mabel
Nelson, M. S.....Granite Falls
Onsgard, C. K.....Halstad
Onsgard, L. K.....Houston
Rhines, D. C.....Caledonia
Sather, E. R.....Alexandria
Tierney, C. M.....Granger
Utley, J. O.....Montrose
Williams, R. V.....Rushford
Woodruff, C. W.....Chatfield

Mower County Medical Society

Regular meetings, last Thursday of every month
Annual meeting, last Thursday of November

President
Hertel, G. E.....Austin
Secretary
Lommen, P. A.....Austin

Allen, A. W.....Austin
Allen, C. C.....Austin
Cobb, Willis F.....Lyle
Coleman, F. B.....Lyle
Grise, W. B.....Austin
Hegge, C. A.....Austin
Hegge, O. H.....Austin
Henslin, A. E.....LeRoy
Hertel, G. E.....Austin
Leck, C. C.....Austin
Lommen, P. A.....Austin
McKenna, J. K.....Austin
Melzer, G. R.....Lyle
Mitchell, R. S.....Austin
Morrow, J. J.....Grand Meadow
Morse, M. P.....LeRoy
Schottler, G. J.....Dexter
Shipley, H. M.....Adams
Torkelson, P. T.....Lyle
Warren, C. L.....LeRoy

Dodge County Medical Society

No regular meetings
Annual meeting, second Wednesday in August

President
Smith, F. D.....Kasson
Secretary
Bigelow, C. E.....Dodge Center

Belt, Wallace E.....Dodge Center
Bigelow, Chas. E...Dodge Center
Clifford, Frank F...West Concord
Harrison, Elmer E..West Concord
Smith, Frank D.....Kasson
Way, Osman F.....Claremont

Olmsted County Medical Society

Regular meetings, second Wednesday in April, June, September and December

Annual meeting, second Wednesday in December

President
Stevens, Geo. .....Byron

Secretary
Piper, M. C.....Rochester

Adams, S. Franklin.....Rochester
Adson, Alfred W.....Rochester
Allen, Roy Wm.....Rochester
Allen, Wilson A.....Rochester
Amberg, Samuel .....Rochester
Anderson, C. M.....Rochester
Asbury, Eslie .....Rochester
Asbury, J. T.....Rochester
Ash, W. A.....Rochester
Balfour, Donald C.....Rochester
Barborka, C. J.....Rochester
Bargen, J. Arnold.....Rochester
Barnes, A. R.....Rochester
Becker, Samuel Wm.....Rochester
Benedict, William L.....Rochester
Bergen, Ralph D.....Rochester
Berkman, David M.....Rochester
Blackford, L. M.....Rochester
Bliss, John Herbert.....Rochester
Bonta, M. B.....Rochester
Boothby, Walter M.....Rochester
Bothe, Fred A.....Rochester
Bowing, Harry H.....Rochester
Braasch, William F.....Rochester
Brading, E. T.....Rochester
Broders, Albert C.....Rochester
Brown, George E.....Rochester
Brown, P. W.....Rochester
Bueerman, Winifred Henry.....Rochester
Buie, L. A.....Rochester
Bumpus, Herman C.....Rochester
Burden, Verne G.....Rochester
Burnes, Arthur .....Rochester
Carman, Russell Daniel.Rochester
Cathcart, E. P.....Rochester
Chambers, Stanley O....Rochester
Cobb, Donnell B.....Rochester
Collins, Harry A.....Rochester
Comfort, M. W.....Rochester
Conner, H. M.....Rochester
Constans, Geo. M.....Rochester
Counseller, Virgil S.....Rochester
Craig, Wm. McK.....Rochester
Crane, W. W., Jr.....Rochester
Crenshaw, John L.....Rochester
Crewe, John E.....Rochester
Culligan, J. M.....Rochester
Culligan, L. C.....Rochester
Daly, Joseph .....Rochester
Davis, A. C.....Rochester
Delamere, G. D.....Rochester
Desjardins, Arthur U....Rochester
Dixon, C. F.....Rochester
Dixon, R. K.....Rochester
Dobson, Herbert Victor.Rochester
Dolder, Felix C.....Eyota
Doyle, John B.....Rochester
Drips, D. G.....Rochester
Dunlap, H. F.....Rochester
Dunn, H. L.....Rochester
Ebert, Joseph William..Rochester
Espenlaub, G. H.....Rochester
Eusterman, Geo. B.....Rochester
Evarts, Arrah B.....Rochester
Faust, L. S.....Rochester
Fawcett, Chas. E.....Stewartville
Figi, F. A.....Rochester
Finney, W. P.....Rochester
Flothow, Paul G.....Rochester
Ford, Frances A.....Rochester
Forsberg, Carl Wm....Rochester
Freed, C. F.....Rochester
Gaarde, Fred W.....Rochester
Garvin, John Day.....Rochester
Giffin, H. Z.....Rochester
Gipner, J. F.....Rochester
Goeckerman, W. H.....Rochester
Granger, Charles T.....Rochester
Green, Carl Hartley....Rochester
Greene, Earl I.....Rochester
Grob, Otto .....Rochester
Haines, S. F.....Rochester
Hallberg, C. A.....Rochester
Hallenbeck, Dorr F.....Rochester
Hanson, W. Arthur.....Rochester
Hargis, E. H.....Rochester
Harrington, Ethel R....Rochester
Harshbarger, Isaac L...Rochester
Hartman, Howard I.....Rochester
Hauser, E. D. W.....Rochester
Heetderks, D. C.....Rochester
Helmholz, H. F.....Rochester
Hempstead, B. E.....Rochester
Hench, Philip S.....Rochester
Henderson, Earl F.....Rochester
Henderson, Melvin S....Rochester
Hendricks, Wm. A.....Rochester
Heyerdale, Oscar C.....Rochester
Holloway, J. K.....Rochester
Horwitz, Alec .....Rochester
Houck, K. H.....Rochester
Huffman, L. D.....Rochester
Hufford, A. R.....Rochester
Hunt, Verne C.....Rochester
Jepson, P. N.....Rochester
Johnson, A. C.....Rochester
Johnson, Henry P.....Rochester
Jones, H. T.....Rochester
Joyce, George T.....Rochester
Judd, Edward Starr....Rochester
Keith, N. M.....Rochester
Kennedy, Roger L. J....Rochester
Kent, George B.....Rochester
Kernohan, J. W.....Rochester
Kilbourne, Arthur F....Rochester
Kilfoy, E. J.....Rochester
Kilgore, Allen M.....Rochester
Kilgore, F. H.....Rochester
Killins, Wendell A.....Rochester
Knight, Mary S.....Rochester
Lapp, Victor R.....Rochester
Latchford, J. K.....Rochester
Leech, Chas. Hoyt.....Rochester
Lemon, Willis S.....Rochester
Lillie, Harold I.....Rochester
Lillie, Walter I.....Rochester
Linton, William B.....Rochester
Logan, Archibald H.....Rochester
Long, W. H.....Rochester
Luden, Georgine .....Rochester
Lundy, John S.....Rochester
Lyday, R. O.....Rochester
McKaig, Carle B.....Pine Island
McQuiggan, M. R.....Rochester
McVicar, Chas. S.....Rochester
Madsen, L. J.....Rochester
Magath, T. B.....Rochester
Mahle, A. E.....Rochester
Malloy, J. F.....Rochester
Marsh, Fred Eugene...Rochester
Marquis, W. James.....Rochester
Masson, D. M.....Rochester
Masson, James C.....Rochester
Mayfield, A. L.....Rochester
Mayo, Charles H.....Rochester
Mayo, William J.....Rochester
Maytum, C. K.....Rochester
Melson, Oliver C.....Rochester
Mentzer, S. H.....Rochester
Merrill, E. Forest.....Rochester
Meyerding, Henry W....Rochester
Moersch, Frederick P...Rochester
Moersch, H. J.....Rochester
Moore, Alex B.....Rochester
Morse, Harry D.....Rochester
Morton, Chas. B.....Rochester
Muhme, N. B.....Rochester
Murphy, A. B.....Rochester
Mussey, Robert B.....Rochester
Nagel, G. W.....Rochester
Nelson, Marque O.....Rochester
New, Gordon B.....Rochester
Ochsenhirt, N. C.....Rochester
Offutt, Susan R.....Rochester
Ohlinger, Lorin B.....Rochester
O'Leary, Paul A.....Rochester
Olson, Ernest A.....Pine Island
Omohundro, Miles P....Rochester
Parker, B. R.....Rochester
Parker, H. L.....Rochester
Parker, J. William.....Rochester
Parker, S. T.....Rochester
Pemberton, John deJ....Rochester
Perry, C. C.....Rochester
Peterman, M. G.....Rochester
Piper, Monte C.....Rochester
Plankers, A. G.....Rochester
Plummer, H. S.....Rochester
Plummer, W. A.....Rochester
Pollock, Lee W.....Rochester
Potter, J. C.....Rochester
Powell, L. D.....Rochester
Prangen, Avery D.....Rochester
Prickman, L. E.....Rochester
Pulford, DeLos Schuyler (Jr.)..Rochester
Randall, L. M.....Rochester
Reid, J. Spence.....Rochester
Rivers, A. B.....Rochester
Robertson, H. E.....Rochester
Rockwood, Paul Reed..Rochester
Rohwer, C. J.....Rochester
Rosenow, Edward C.....Rochester
Rowntree, L. G.....Rochester
Sager, Wm. W.....Rochester
Sanford, Arthur H.....Rochester
Schmitt, E. O. G.....Rochester
Schulz, Irwin .....Rochester
Sheldon, Walter D.....Rochester
Simon, H. E.....Rochester
Sistrunk, Walter E.....Rochester
Smith, F. L.....Rochester
Snell, A. M.....Rochester
Stacy, Leda June.....Rochester
Stark, W. B.....Rochester
Steven, George .....Byron
Stevens, J. P.....Rochester
Stinson, J. W.....Rochester
Sutherland, C. G.....Rochester
Swan, Theo. S.....Rochester
Synholst, A. P.....Rochester
Thompson, J. W.....Rochester
Underhill, M. S.....Rochester
Vinson, Porter P.....Rochester
Von Lackum, W. H.....Rochester
Wagener, H. P.....Rochester
Walters, H. W.....Rochester
Webber, I. M.....Rochester
Weir, J. F.....Rochester
Wilder, Russell M.....Rochester
Wilkinson, H. F.....Rochester
Williamson, Carl S.....Rochester
Willius, Fredrick A.....Rochester
Woltman, Henry W. F...Rochester
Yoakem, H. H.....Rochester
Ziegler, Lloyd H.....Rochester

Waseca County Medical Society

Annual meeting, second Monday in December

President
Miller, H. A.....Waseca

Secretary
Gallagher, B. J.....Waseca

Blanchard, H. G.....Waseca
Chamberlin, W. A.....Waseca
Cory, W. M.....Waterville
Gallagher, B. J.....Waseca
Hagen, H. O.....New Richland
Leopard, B. A.....New Richland
McIntire, H. M.....Waseca
Miller, H. A.....Waseca
O'Hara, J. J.....Janesville
Swartwood, F. A.....Waseca

Winona County Medical Society

Regular meetings, second Tuesday in January, April, July and October

Annual meeting, second Tuesday in January

President
Risser, E. D.....Winona

Secretary
Steiner, I. W.....Winona

Adler, S. W.....Winona
Baer, H. C.....St. Charles
Benoit, F. T.....Winona
Clay, F. H.....St. Charles
Heise, W. F. C.....Winona
Keyes, E. D.....Winona
Leicht, O. .....Winona
Lichtenstein, H. .....Winona
Lindsay, W. V.....Winona
McLaughlin, E. M.....Winona
Nauth, W. W.....Winona
Neumann, C. A.....Lewiston
Neumann, W. H...Sheboygan, Wis.
Pritchard, D. B.....Winona
Risser, E. D.....Winona
Robbins, C. P.....Winona
Rosenberry, B. P.....Winona
Schaefer, S. .....Winona
Schnarrenberger, G...Rollingstone
Scott, J. W.....St. Charles
Steiner, I. W.....Winona
Tweedy, G. J.....Winona

Freeborn County Medical Society

Regular meetings upon call of members

Annual meeting, December 17

President
Von Berg, J. P.....Albert Lea

Secretary
Gamble, J. W.....Albert Lea

Branham, D. S.....Albert Lea
Burns, H. D.....Albert Lea
Buturff, C. R.....Freeborn
Calhoun, F. W.....Albert Lea
Folken, F. G.....Albert Lea
Freeman, J. P.....Glenville
Gamble, J. W.....Albert Lea
Gamble, P. M.....Albert Lea
Gullixson, A. .....Albert Lea
Kamp, B. A.....Albert Lea
King, W. I.....Albert Lea
Nannestad, J. R.....Albert Lea
Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Shultz, J. A.....Albert Lea
Vollum, E. O.....Albert Lea
Von Berg, J. P.....Albert Lea

Steele County Medical Society

Regular meetings, second Tuesday in February, April, June, August and October

Annual meeting, December 9

President
Stewart, A. B.....Owatonna

Secretary
Senn, E. W.....Owatonna

Andrist, J. W.....Owatonna
Daily, W. J.....Blooming Prairie
Ertel, E. Q.....Ellendale
Gamble, R. M.....Ellendale
Hart, A. B.....Owatonna
McIntyre, J. A.....Owatonna
Melby, B. .....Blooming Prairie
Peterson, C. .....Owatonna
Quigley, T. C.....Owatonna
Senn, E. W.....Owatonna
Smersh, F. M.....Owatonna
Smersh, J. F.....Owatonna
Stewart, A. B.....Owatonna
Thimsen, N. C...Blooming Prairie

ALPHABETICAL ROSTER

Aanes, A. M.....Red Wing
Abbott, A. W.....Minneapolis
Abbott, J. S.....St. Paul
Abbott, Wm. P.....Duluth
Aborn, W. H.....Hawley
Abramovich, J. H.....St. Paul
Adair, F. L.....Minneapolis
Adams, B. S.....Hibbing
Adams, J. L.....Morgan
Adams, J. W.....Waite Park
Adams, L. P.....Sauk Rapids
Adams, R. C.....Bird Island
Adams, S. Franklin....Rochester
Adkins, C. M.....Grygla
Adler, Stuart Welsh.....Winona
Adson, A. W.....Rochester
Agnew, Allen T.....
International Falls
Ahlfs, J. A.....Erskine
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Ahrens, E. G.....Ah Gwah Ching
Aitkens, H. B.....Le Sueur Center
Akester, Ward .....Marshall
Alberts, Max W.....St. Paul
Alden, J. F.....St. Paul
Aldes, Harry .....St. Paul
Aldrich, F. H.....Belview
Alexander, F. H.....St. Paul
Aling, C. P.....Minneapolis
Allen, A. W.....Austin
Allen, Chas. C.....Austin
Allen, F. A. .....Crosby
Allen, F. H.....Staples
Allen, H. W.....Minneapolis
Allen, Mason .....St. Paul
Allen, Roy William....Rochester
Allen, W. A.....Rochester
Allison, R. G.....Minneapolis
Almquist, H. E.....Minneapolis
Amberg, Samuel .....Rochester
Amundson, A. E.....Little Falls
Anderson, A. E.....Minneapolis
Anderson, A. G.....Minneapolis
Anderson, Arnold S.....
Ah Gwah Ching
Anderson, C. M.....Rochester
Anderson, David D...Minneapolis
Anderson, Edward Dyer.....
Minneapolis
Anderson, Frank J...Minneapolis
Anderson, H. C.....**Duluth**
Anderson, J. K.....Deerwood
Anderson, J. V.....Red Wing
Anderson, Norman E....Harmony
Anderson, R. E.....Atwater
Anderson, S. H.....Red Wing
Anderson, W. S.....Minneapolis
Anderson, W. T.....St. Paul
Andrews, J. W.....Mankato
Andrews, R. N.....Mankato
Andrist, J. W.....Owatonna
Annis, H. B.....Minneapolis
Archibald, Frank M...Mahnomen
Arends, A. L.....St. Paul
Arey, H. C.....Excelsior
Arminen, K. V.....Duluth
Armstrong, E. L.....Duluth
Armstrong, J. M.....St. Paul
Arnold, E. W.....Adrian
Arnold, James E...Vernon Center
Aune, Martin .....Minneapolis
Arnquist, A. S.....St. Paul
Arnson, J. M.....Graceville
Arouni, Khalil .....St. Paul
Arvidson, C. G.....Minneapolis
Arzt, C. P.....St. Paul
Asbury, Eslie .....Rochester
Asbury, J. T.....Rochester
Ash, Wilfrid Anthony..Rochester
Athens, A. S.....**Duluth**
Atkins, G. L. .....Jackson
Aurand, W. H.....Minneapolis
Aurness, P. A. .....Minneapolis
Ausman, Carl F.....Paynesville
Avery, J. Fowler.....Minneapolis
Axilrod, D. L.....Hutchinson
Aylmer, A. L.....Minneapolis
Ayres, G. T. .....Ely
Babcock, F. M.....Northfield
Backe, S. H. .....Kenyon
Bacon, Donald K.....St. Paul
Bacon, Knox .....St. Paul
Bacon, L. C.....St. Paul
Badeaux, G. I. .....Brainerd
Baer, H. C. .....St. Charles
Bagley, W. R.....Duluth
Bailey, H. B.....Ceylon
Baken, Melvin P.....Minneapolis
Baker, A. C. .....Fergus Falls
Baker, Alfred T.....Minneapolis
Baker, E. L.....Minneapolis
Bakke, O. H.....Minneapolis
Balcome, F. E.....St. Paul
Baldwin, L. B.....Minneapolis
Balfour, D. C.....Rochester
Ball, C. R.....St. Paul
Barber, J. P.....Minneapolis
Barborka, C. J.....Rochester
Barden, Norman ....Minneapolis
Barfield, J. J.....Granite Falls
Bargen, J. Arnold.....Rochester
Barnes, A. R.....Rochester
Barney, L. A.....Duluth
Barrett, Fred .....Gilbert
Barron, Moses .....Minneapolis
Barry, L. W.....St. Paul
Barsness, Nellie .....St. Paul
Basinger, Harvey R.....
Mountain Lake
Baskett, George T.....St. Peter
Baskett, Olive T.....St. Peter
Bass, G. W.....Minneapolis
Bates, B. V.....Wheaton
Baxter, S. H.....Minneapolis
Bayley, E. H.....Lake City
Beadle, W. D.....Cannon Falls
Beals, Hugh .....St. Paul
Beard, Archie H.....Minneapolis
Beaty, J. H.....St. Cloud
Becker, Samuel William.....
Rochester
Bedford, E. W.....Minneapolis
Beede, Ethel .....Faribault
Behmier, Fred W.....Appleton
Beise, R. A.....Brainerd
Bell, C. C.....St. Paul
Bell, J. W.....Minneapolis
Bell, J. Warren, Jr...Minneapolis
Belt, W. E.....Dodge Center
Benedict, E. E.....Minneapolis
Benedict, W. L.....Rochester
Benepe, L. M.....St. Paul
Benham, E. W.....Mankato
Benjamin, A. E.....Minneapolis
Benn, F. G.....Minneapolis
Bennion, P. H.....St. Paul
Benoit, F. T.....Winona
Benson, R. D.....Minneapolis
Bentley, Norman P.....St. Paul
Berdez, G. L.....Duluth
Bergen, Otto .....Clinton
Bergen, Ralph D.....Rochester
Bergh, L. N.....Montevideo
Bergheim, M. C.....Hawley
Bergman, O. B.....Janesville
Bergquist, K. E.....Duluth
Berkman, D. M.....Rochester
Bernard, B. C...Thief River Falls
Berrisford, Paul D.....St. Paul
Bertelson, O. L.....Crookston
Bessesen, A. N., Sr...Minneapolis
Bessesen, A. N., Jr...Minneapolis
Bessesen, Daniel H...Minneapolis
Bessesen, W. A.....Minneapolis
Best, F. E. .....Wells
Biedermann, Jacob .....
Thief River Falls
Bigelow, C. E.....Dodge Center
Binger, H. E.....St. Paul
Birnberg, T. L.....St. Paul
Bishop, Chas. Wesley.....
Minneapolis
Bissell, F. S.....Minneapolis
Bjorgo, C. W.....Cannon Falls
Black, Wm. .....Mankato
Blackford, Launcelot Minor
Rochester
Blacklock, S. S.....Hibbing
Blake, Jas. .....Hopkins
Blakely, C. C. .....Barnum
Blanchard, H. G.....Waseca
Blanton, Smiley .....Minneapolis
Blaustone, Henry H..Minneapolis
Blegen, H. M.....Warren
Bliss, John Herbert....Rochester
Bock, R. A.....St. Paul
Bockman, M. W. H..Minneapolis
Boeckmann, Edward ....St. Paul
Boeckmann, Egil .....St. Paul
Boehm, J. C.....St. Cloud
Bohland, E. H.....St. Paul
Bohland, F. J. von...Belle Plaine
Bohling, B. S.....Sandstone
Bole, R. S.....St. Paul
Boleyn, E. S.....Stillwater
Bolles, D. W.....Long Beach, Cal.
Bolsta, Chas. .....Ortonville
Bolstad, H. C.....St. Paul
Boman, P. G.....Duluth
Bone, Merle .....Kelliher
Bong, J. H.....Jasper
Bonta, M. B.....Rochester
Booth, A. E.....Minneapolis
Boothby, W. M.....Rochester
Boquist, E. T. W.....Minneapolis
Boreen, C. A.....Minneapolis
Borreson, B. .....Remer
Bossert, C. S.....Mora
Bossingham, O. N....Lake Benton
Bosworth, Robinson .....St. Paul
Bothe, Frederick Augustus.....
Rochester
Bottolfson, B. T.....Moorhead
Bouma, L. R.....St. Paul
Bouman, H. A.....Minneapolis
Bowen, R. L.....Hibbing
Bowers, J. T....Thief River Falls
Bowing, H. H.....Rochester
Bowing .....St. Cloud
Boyer, S. H.....Duluth
Boysen, H. .....Truman
Boysen, P. .....Pelican Rapids
Braasch, Wm. F.....Rochester
Brabec, F. G.....Perham
Bracken, H. M.....New York City
Braden, A. J. .....Duluth
Brading, Edward Thurston....
Rochester
Bradley, E. L.....Duluth
Brand, G. D.....St. Paul
Brand, W. A.....Redwood Falls
Branham, D. S.....Albert Lea
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Bratrud, A. F.....Minneapolis
Bratrud, O. Edward.....Warren
Bratrud, Theodor .....Warren
Bray, C. W.....Biwabik
Bray, E. R.....St. Paul
Bregel, Fred L.....St. James
Briggs, F. W.....Duluth
Brigham, C. F.....St. Cloud
Brigham, Frank .....Watkins
Brimhall, J. B.....St. Paul
Broberg, J. A.....Blue Earth
Broders, A. C.....Rochester
Brodie, Walter D.....St. Paul
Broker, W. S.....Battle Lake
Brooks, Chas. N.....Minneapolis
Brooks, D. F.....St. Paul
Brooks, G. F.....St. Paul
Brown, A. E.....Stillwater
Brown, A. H.....Pipestone
Brown, Edgar D.....Minneapolis
Brown, Ed. I. .....St. Paul
Brown, Edw. J.....Minneapolis
Brown, G. E. .....Rochester
Brown, John C.....St. Paul
Brown, Lyle L.....Crookston
Brown, P. W.....Rochester
Brown, R. S.....Minneapolis
Browning, W. E.....Caledonia
Brunet, L. M...River Rouge, Mich.
Buck, Fred H.....Shakopee
Bueerman, Winifred Henry....
Rochester
Buie, L. A.....Rochester
Bulkley, Kenneth ...Minneapolis
Bullen, F. W.....Hibbing
Bumpus, H. C.....Rochester
Burch, F. E.....St. Paul
Burden, Verne G.....Rochester
Burfiend, G. H.....St. Paul
Burnap, W. L.....Fergus Falls
Burns, Arthur .....Rochester
Burns, F. W.....St. Paul
Burns, H. D.....Albert Lea
Burns, H. J.....Duluth
Burns, M. A. .....Milan
Burns, R. L.....Two Harbors
Burns, R. M.....St. Paul
Buscher, H. .....St. Paul
Bushey, M. E.....Arlington
Butler, John .....Minneapolis
Button, A. J.....Hackensack
Buttuff, C. R.....Freeborn
Butz, J. A. .....Monterey
Byrnes, W. J.....Minneapolis
Cabot, V. S.....Minneapolis
Caine, A. T.....Anoka

Caine, C. E. .....Morris
Caldwell, Kenneth S.....St. Paul
Caley, G. R. .....Princeton
Calhoun, F. W. .....Albert Lea
Callahan, F. F. .....Pokegama
Cameron, J. A. .....St. Paul
Camp, W. E. .....Minneapolis
Campbell, D. R. .....Bagley
Campbell, J. E. .....South St. Paul
Campbell, L. M. .....Minneapolis
Campbell, Robert .....Minneapolis
Cannon, Harry .....St. Paul
Cantwell, W. F. .....
International Falls
Carey, Jas. B. .....Minneapolis
Carlaw, C. M. .....Minneapolis
Carman, Paul I. .....St. Paul
Carman, Russell Daniel. .....
Rochester
Carroll, Wm. C. .....St. Paul
Carstens, C. F. .....Hibbing
Carter, Fred G. .....St. Paul
Cathcart, E. P. .....Rochester
Catlin, John J. .....Buffalo
Catlin, T. J. .....Buffalo
Cavanaugh, J. O. .....St. Paul
Chadbourn, A. G. .....Heron Lake
Chamberlin, W. A. .....Waseca
Chambers, Stanley Owen. .....
Rochester
Chambers, W. C. .....Blue Earth
Chandler, O. B. .....St. Paul
Chapman, T. L. .....Duluth
Chatterton, C. C. .....St. Paul
Cheleen, S. J. .....Minneapolis
Cheney, E. L. .....Duluth
Christenson, C. R. .....Starbuck
Christensen, E. P. .....Two Harbors
Christiansen, A. .....St. Paul
Christianson, H. W. .....Wykoff
Christie, G. R. .....Long Prairie
Christie, R. L. .....Long Prairie
Christison, J. T. .....St. Paul
Cirkler, A. A. .....Minneapolis
Clair, J. B. .....Winsted
Clark, Chester H. .....Gallup, N. M.
Clark, F. F. .....Duluth
Clark, H. B. .....St. Cloud
Clark, H. S. .....Minneapolis
Clark, Lenna E. .....Gallup, N. M.
Clark, T. C. .....Minneapolis
Clay, E. M. .....Renville
Clay, F. H. .....St. Charles
Claydon, L. E. .....Red Wing
Clement, J. B. .....Lester Prairie
Clifford, F. F. .....West Concord
Clifton, Theo. A. .....Chatfield
Cobb, Donnell B. .....Rochester
Cobb, S. G. .....St. Paul
Cobb, Willis F. .....Lyle
Cochrane, W. J. .....Lake City
Colby, Woodard .....St. Paul
Cole, H. B. .....Redwood Falls
Cole, Wallace H. .....St. Paul
Coleman, F. B. .....Austin
Collie, H. G. .....St. Paul
Collins, A. N. .....Duluth
Collins, Harry R. .....Rochester
Collins, H. C. .....Duluth
Collins, J. S. .....Wabasha
Colvin, A. R. .....St. Paul
Comfort, Mandred Whitset. .....
Rochester
Comstock, A. E. .....St. Paul
Condit, W. H. .....Minneapolis
Conley, Alva A. .....Cannon Falls
Conner, H. M. .....Rochester
Conner, Wm. H. .....St. Paul
Connor, C. E. .....St. Paul
Constans, Geo. Maurice. .....
Rochester
Cook, Henry Wireman. .....
Minneapolis
Cook, Paul B. .....St. Paul
Cooney, H. C. .....Princeton
Cooper, M. D. .....Winnebago City
Corbett, J. Frank. .....Minneapolis
Corrigan, J. E. .....Spooner
Cory, W. M. .....Waterville
Cosgriff, J. A. .....Mankato
Cosgrove, J. H. .....Duluth
Cosman, E. O. .....Minneapolis
Counseller, Virgil S. .....Rochester
Countryman, Roger S. .....St. Paul
Covell, W. W. .....St. Peter
Coventry, W. A. .....Duluth
Cowern, E. W. .....North St. Paul
Cowing, P. G. .....Evansville
Crafts, Leo M. .....Minneapolis
Craig, C. C. .....International Falls
Craig, Wm. McK. .....Rochester
Crandall, A. M. .....Madison
Crandall, William .....Graceville
Crane, Wm. Whitfield, Jr. .....
Rochester
Cranmer, Richard R. .Minneapolis
Cremer, M. H. .....Red Wing
Cremer, Peter Hubert. .Hastings
Crenshaw, J. L. .....Rochester
Cress, E. E. .....Boyd
Cress, P. J. .....Ellsworth
Crewe, J. E. .....Rochester
Critchfield, L. R. .....St. Paul
Cross, J. G. .....Minneapolis
Crow, E. R. .....Minneapolis
Crowe, J. H. .....Virginia
Crowl, Verne C. .....Bertha
Crume, Geo. P. .....Minneapolis
Culligan, J. M. .....Rochester
Culligan, Geo. Courtney. .....
Rochester
Curtin, John F. .....Minneapolis
Cutts, G. A. C. .....Litchfield
Cutts, George .....Minneapolis
Cyr, A. .....Barnesville
Dack, Lloyd G. .....St. Paul
Dahl, Elmer O. .....Minneapolis
Dahl, G. A. .....Mankato
Dahl, John A. .....Minneapolis
Dahlin, I. T. .....Coleraine
Dahlstrom, A. W. .....Minneapolis
Daignault, Oscar .....Benson
Dailey, W. J. .....Blooming Prairie
Daly, Joseph .....Rochester
Daniel, Donald H. .....Minneapolis
Daniels, H. A. .....Eveleth
Daniels, J. W. .....St. Peter
Daniels, W. H. .....Crookston
Danielson, K. A. .....Litchfield
Darling, J. B. .....St. Paul
Darrow, D. C. .....Moorhead
Dart, Leslie O. .....Minneapolis
Daugherty, E. B. .....St. Paul
Daugherty, L. E. .....St. Paul
Davis, Austin Clifford. .Rochester
Davis, B. F. .....Duluth
Davis, F. U. .....Faribault
Davis, Herbert .....St. Paul
Davis, H. S. .....Duluth
Davis, Lloyd Thomas. .....Wadena
Davis, Thayer Clinton. .Wadena
Davis, William .....St. Paul
Davison, P. C. .....Willmar
DeBoer, Hermann .....Edgerton
Dedolph, Karl .....St. Paul
Delamere, Granville Sinclair. ..
Rochester
Delmore, J. L. .....Roseau
Delude, S. .....Dassel
Dempsey, D. P. .....Kellogg
Denman, A. V. .....Mankato
Derauf, B. I. .....Brainerd
Desjardins, Arthur U. .Rochester
Dezell, Earl R. .....Minneapolis
Deziel, G. .....Minneapolis
Dickson, Thos. H. Jr. .St. Paul
Diehl, Harold S. .....Minneapolis
Diessner, H. D. .....Minneapolis
Disen, C. F. .....Minneapolis
Ditmeier, L. M. Gerber. .Jasper
Dittman, Geo. C. .....St. Paul
Dixon, Claude F. .....Rochester
Dixon, Robert Kenneth. Rochester
Dobson, Herbert Victor. Rochester
Doctor, William R. .Minneapolis
Dodge, F. A. .....Le Sueur
Dohm, A. J. .....St. Paul
Dolan, C. P. .....Worthington
Dolder, F. C. .....Eyota
Doms, H. C. .....Slayton
Doms, Wm. .....Woodstock
Donaldson, C. A. .....Minneapolis
Donohue, P. F. .....St. Paul
Doolittle, L. E. .....Duluth
Dorge, Richard I. .....Minneapolis
Dornblaser, H. Bright. .....
Minneapolis
Douglass, J. E. .State Sanatorium
Dowswell, W. J. .....Benson
Doxey, G. L. .....Minneapolis
Doyle, George C. .....Duluth
Doyle, J. B. .....Rochester
Drake, Carl B. .....St. Paul
Drake, C. R. .....Minneapolis
Drake, F. A. .....Lanesboro
Dredge, H. P. .....Sandstone
Drenning, F. C. .....Duluth
Driesbach, N. .....Minneapolis
Drips, D. G. .....Rochester
Drought, W. W. .....Fergus Falls
Dryden, F. M. .....Crookston
Dubbe, F. H. .....New Ulm
DuBois, J. A. .....Sauk Center
DuBois, J. F. .....Sauk Center
Dudley, J. H. .....Windom
Dumas, Alexander G. .Minneapolis
Dunlap, H. F. .....Rochester
Dunlap, Alex .....Crookston
Dunn, Geo. Robt. .....Minneapolis
Dunn, Halbert Louis. .Rochester
Dunn, J. N. .....St. Paul
Dunn, Louis .....Minneapolis
Dunne, Gerald P. .....Isle
Dunsmoor, F. A. .....Minneapolis
Dutton, C. E. .....Minneapolis
Earl, George A. .....St. Paul
Earl, Robert O. .....St. Paul
Eberlin, E. A. .....Glenwood
Ebert, Joseph William. Rochester
Eby, C. B. .....Spring Valley
Ecklund, E. C. .....Hibbing
Eckman, P. F. .....Duluth
Eckstein, A. W. .....Comfrey
Edlund, G. .....St. Paul
Edwards, Ralph T. .....Elysian
Egilsrud, Kristian. .Minneapolis
Ehrenberg, C. J. .....Minneapolis
Eisengraeber, G. A. .....
Los Angeles, Calif.
Eisenman, W. G. .....Chisholm
Eisler, Edwin R. .....Minneapolis
Eitel, G. G. .....Minneapolis
Ekblad, J. W. .....Duluth
Eklund, C. T. .....Duluth
Eklund, W. J. .....Duluth
Elias, F. J. .....Duluth
Ellison, David E. .....Minneapolis
Ellison, Frank E. .....Monticello
Elsey, J. R. .....Glenwood
Ely, O. S. .....South St. Paul
Empie, W. M. .....Virginia
Engberg, E. J. .....St. Paul
Engh, Sigfred .....Cottonwood
Eppard, R. M. .....Cloquet
Erb, F. A. .....Minneapolis
Ericson, J. A. .....Minneapolis
Ericson, Swan .....Le Sueur
Ernest, G. C. .....St. Paul
Ertel, E. Q. .....Ellendale
Eshelby, E. C. .....St. Paul
Espenlaub, George Henry. .....
Rochester
Esser, John .....Perham
Estrem, C. O. .....Fergus Falls
Eusterman, G. B. .....Rochester
Evarts, Arrah B. .....Rochester
Everlof, J. L. .....Minneapolis
Evert, J. A. .....St. Paul
Ewens, H. B. .....Virginia
Ewing, C. F. .....Wheaton
Fahey, E. W. .....St. Paul
Fansler, W. A. .....Minneapolis
Farr, R. E. .....Minneapolis
Farrist, R. C. .....Sherburn
Faust, Louis Sanders. .Rochester
Fawcett, C. E. .....Stewartville
Feidt, W. W. .....Minneapolis
Ferguson, J. C. .....St. Paul
Ferreira, G. J. .....Aurora
Fesler, Harold H. .....St. Paul
Field, Merton .....Northfield
Figi, F. A. .....Rochester
Fiksdal, M. J. .....Willmar
Finney, W. P. .....Rochester
Fischer, G. .....Minneapolis
Fischer, H. P. .....Shakopee
Fischer, O. F. .....Houston
Fischer, P. M. .....Shakopee
Fisher, J. M. .....St. Peter
Fitzgerald, E. T. .....Morris
Fjeldstad, C. Alfred. Minneapolis
Fjellman, R. C. .....Minneapolis
Flagstad, A. E. .....St. Paul
Flinn, B. P. .....Redwood Falls
Flinn, F. E. .....Redwood Falls
Fleming, J. .....Cloquet
Fleischhauer, D. S. .....Wabasha
Fleming, A. S. .....Minneapolis
Fleming, C. Filmore. Minneapolis
Fleming, James .....Cloquet
Fleming, T. N. .....St. Cloud
Flocken, Chas. F. .....Minneapolis
Flom, A. O. .....Chisago City
Flothow, Paul George. .Rochester
Flower, W. Z. .....Minneapolis
Fogarty, Chas. W. .....St. Paul
Foley, F. E. B. .....St. Paul
Folken, F. G. .....Albert Lea
Forbes, R. S. .....Duluth
Ford, Burton C. .....Marshall
Ford, Frances A. .....Rochester
Forrest, C. G. .....Clearbrook
Forsberg, Carl William. Rochester

Fowler, L. H.....Minneapolis
Fox, John M.....Minneapolis
Franchere, F. W....Lake Crystal
Franzen, H. G.....Minneapolis
Freeborn, J. A.....Fergus Falls
Freed, C. F.....Rochester
Freed, O. J. R.....Cokato
Freeman, C. D.....St. Paul
Freeman, G. E.....Willmar
Freeman, J. P.....Glenville
Freeman, W. L.....St. Cloud
Freligh, E. O. B.....Stillwater
French, E. A.....Plainview
French, H. S.....New London
Friesleben, Wm.....Sauk Rapids
Frisch, F. P.....Richmond
Fritsche, Albert .....New Ulm
Fritsche, L. A.....New Ulm
Froelich, H. W. Thief River Falls
Frost, E. H.....Willmar
Fuerste, Frederick .....Proctor
Fugina, George R. Madison Lake
Fulton, J. F.....St. Paul
Furber, W. W.....Cottage Grove
Gaarde, F. W.....Rochester
Gager, E. C.....St. Paul
Gaines, E. C.....Buffalo Lake
Gallagher, B. J.....Waseca
Gamble, J. W.....Albert Lea
Gamble, R. M.....Albert Lea
Gammell, J. H.....Minneapolis
Gardiner, D. G.....St. Paul
Gardner, Edwin L...Minneapolis
Gardner, R. D.....Eveleth
Garlock, A. V.....Bemidji
Garlock, Dewitt Howard. Bemidji
Garwin, John Day.....Rochester
Gates, C. E.....Anoka
Gausemel, S. D.....Goodhue
Gauthier, W. L.....Virginia
Geer, Everett K.....St. Paul
Geissenger, John D.....St. Paul
Geist, Emil S.....Minneapolis
Geist, George A.....St. Paul
Gelz, J. J.....St. Cloud
Gendron, J. F.....Grand Rapids
Gerber, Milo P.....Brainerd
Germo, Chas.....Balaton
Ghent, C. Harry.....St. Paul
Ghent, M. M.....St. Paul
Ghostley, Mary C.....
International Falls
Gibbon, L. L.....Lowry
Gibson, A. J.....Duluth
Giere, E. O.....St. Paul
Geissler, Paul W....Minneapolis
Giffin, H. Z.....Rochester
Gilbert, J. D.....Carlton
Gilles, F. L.....Minneapolis
Gillespie, M. G.....Duluth
Gillespie, N. H.....Duluth
Gilfillan, J. S.....St. Paul
Ginsberg, Wm. .....St. Paul
Gipner, John Frederick.....
Rochester
Giroux, A. A.....Duluth
Goeckerman, W. H.....Rochester
Goehrs, H. W.....St. Cloud
Golden, C. M.....Tyler
Goltz, E. V.....St. Paul
Goodheart, C. J.....Akeley
Goodman, C. E.....Virginia
Goodson, Catherine M.....
Retreat, Pa.
Gordon, Geo. J.....Minneapolis
Gosin, D. F.....Minneapolis
Goss, Harold .....Minneapolis
Gosslee, G. L.....Moorhead
Gough, W. H.....Granada
Graham, David .....Duluth
Graham, R. D.....Duluth
Graham, Robert .....Duluth
Granger, C. T.....Rochester
Grant, H. W.....St. Paul
Gratzek, Thos. .....St. Paul
Grave, Floyd .....Minneapolis
Grawn, F. A.....Duluth
Gray, F. D.....Marshall
Greeley, L. Q.....Duluth
Green, E. K.....Minneapolis
Greene, Carl Hartley..Rochester
Greene, Charles L.....St. Paul
Greene, Earle Ira.....Rochester
Griffin, P. J.....Gary
Grimes, H. B.....Madelia
Grise, W. B.....Austin
Grob, Otto .....Rochester
Groll, S. .....Minneapolis
Grovet, F. E.....Duluth
Gruenhagen, Arnold P...St. Paul
Gulde, W. C.....St. Cloud
Gullixson, A. .....Albert Lea
Gunderson, Harley J.....
Minneapolis
Gunderson, Nels A...Minneapolis
Gunderson, R. M.....Lake Park
Gunz, A. N.....Center City
Gutsell, R. S.....Zumbro Falls
Guyer, L. G.....Nopeming
Habein, Harold C.....Rochester
Haberman, E. .....Osakis
Hacking, Frank H...Minneapolis
Haessley, S. B.....Faribault
Hagaman, Geo. K.....St. Paul
Hagen, G. L.....Minneapolis
Hagen, H. O.....New Richland
Hagen, O. E.....Butterfield
Hagen, O. J.....Moorhead
Haggard, G. D.....Minneapolis
Haight, G. G.....Audubon
Haines, J. H.....Stillwater
Haines, S. F.....Rochester
Halenbeck, P. L.....Crosby
Hall, A. R.....St. Paul
Hall, E. L.....Princeton
Hall, J. M.....Minneapolis
Hall, P. M.....State Sanatorium
Hallberg, C. A.....Rochester
Hallenbeck, D. F.....Rochester
Halloran, Walter .....Jackson
Halper, Philip .....St. Paul
Hamel, Arnold L.....Minneapolis
Hamel, C. E.....Minneapolis
Hamilton, A. S.....Minneapolis
Hamlin, George B...Minneapolis
Hammermeister, Theo. F.....
New Ulm
Hammes, E. M.....St. Paul
Hammond, A. J.....Minneapolis
Hammond, J. F.....St. Paul
Hand, W. R.....Elbow Lake
Haney, C. L.....Duluth
Hansen, Elmer H....Minneapolis
Hansen, Erling .....Minneapolis
Hansen, Olga S.....Minneapolis
Hanson, A. M.....Faribault
Hanson, H. J.....Minneapolis
Hanson, W. Arthur..Minneapolis
Hare, E. R.....Minneapolis
Hargis, Estes Henry..Rochester
Harmon, G. E.....St. Paul
Harriman, L.....Howard Lake
Harrington, C. D.....Minneapolis
Harrington, Ethel R...Rochester
Harrington, F. E.....Minneapolis
Harris, C. N.....Nashwauk
Harrison, E. E.....West Concord
Harshbarger, Isaac Long.....
Rochester
Hart, A. B.....Owatonna
Hartman, H. R.....Rochester
Hartzell, Thos. B.....Minneapolis
Haskell, A. D.....Alexandria
Haskins, John L.....Northfield
Hassett, Roger G.....Bird Island
Hatch, W. E.....Duluth
Haugen, G. T.....Fergus Falls
Hauser, Emil D. Wm...Rochester
Hauser, V. P.....St. Paul
Haverfield, Addie K..Minneapolis
Hawkins, E. P.....Montrose
Hawkins, V. J.....St. Paul
Hayes, J. M.....Minneapolis
Hayes, M. F.....Nashwauk
Head, G. D.....Minneapolis
Healy, R. T.....Pierz
Hearn, Wm. O.....Minneapolis
Heath, A. C.....St. Paul
Hebelsen, M. B.....Carver
Hedback, A. E.....Minneapolis
Hedding, J. A.....Minneapolis
Hedenstrom, L. H.....Cambridge
Heetdecks, D. R.....Rochester
Hegge, C. A.....Austin
Hegge, O. H.....Austin
Heim, Russell R.....Minneapolis
Heimark, J. H.....Moorhead
Heimark, O. E.....Duluth
Heise, W. F. C.....Winona
Helk, H. H.....Minneapolis
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Helmholz, H. F.....Rochester
Hempstead, B. E.....Rochester
Hemstead, Werner .....St. Cloud
Hench, Philip S.....Rochester
Henderson, A. J.....Kiester
Henderson, Earl Fletcher.....
Rochester
Henderson, M. S.....Rochester
Hendricks, Wm. A.....Rochester
Hendrickson, J. F...Minneapolis
Hengstler, W. H.....St. Paul
Henney, Wm. H.....McIntosh
Henriksen, H. G.....Elko
Henry, C. E.....Minneapolis
Henry, Myron O.....Minneapolis
Hensel, C. N.....St. Paul
Henslin, A. E.....LeRoy
Herbst, Wm. P.....Minneapolis
Herman, Arthur L...Minneapolis
Herman, S. .....Welcome
Hermann, Edgar T.....St. Paul
Hertel, G. E.....Austin
Hesselgrave, S. S.....St. Paul
Heyerdale, O. C.....Rochester
Hiebert, J. P.....Minneapolis
Hielscher, Helen H.....Mankato
Hielscher, Julian A.....Mankato
Higgins, J. H.....Minneapolis
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
Hilger, J. M.....Iona
Hilger, L. A.....St. Paul
Hill, Eleanor J.....Minneapolis
Hill, Frederick E.....Duluth
Hirschboeck, F. J.....Duluth
Hirschfield, F. R....Minneapolis
Hirschfield, M. S.....Duluth
Hitchings, W. P.....Lakefield
Hoaglund, A. W.....Minneapolis
Hobbs, C. A.....Minneapolis
Hochfilzer, J. J.....St. Paul
Hodapp, R. J.....Willmar
Hodge, S. V.....Minneapolis
Hodgson, H. H.....Crookston
Hoff, Alfred .....St. Paul
Hoff, Peder A.....St. Paul
Hoffman, Max H.....St. Paul
Hoidale, A. D.....Tracy
Holland, A. S.....Minneapolis
Hoit, E. E.....Detroit
Holbrook, J. S.....Mankato
Holcomb, J. T.....St. Paul
Holcomb, O. W.....St. Paul
Holdridge, Geo. .....Foley
Holen, T. .....Minneapolis
Holl, P. M.....Minneapolis
Hollands, W. H.....Fisher
Holloway, Jackson K...Rochester
Holm, Geo. A.....Minneapolis
Holm, H. H.....Glencoe
Holm, P. F.....Wells
Holman, C. J.....Mankato
Holman, E. E.....Pine River
Holmberg, L. J.....Canby
Holmes, A. E.....Rush City
Holmes, W. B.....Ada
Holst, C. F.....Little Falls
Holst, J. B.....Little Falls
Holte, H. .....Crookston
Horwitz, Alec .....Rochester
Houck, Knut Hoegh...Rochester
House, Z. E.....Cass Lake
Houston, C. A.....Park Rapids
Hovde, H. .....Duluth
Howard, Merrill A.....St. Paul
Howard, William H...Minneapolis
Howard, W. S.....St. Paul
Huenekens, E. J....Minneapolis
Huffman, Lester Dale..Rochester
Hufford, Alvin Roy....Rochester
Hughes, Louis D.....Minneapolis
Hulisiek, H. E.....St. Paul
Hultkrans, Joel C.....St. Paul
Humphrey, E. W.....Moorhead
Humphrey, W. R.....Stillwater
Hunt, F. N.....Fairmont
Hunt, H. E.....St. Paul
Hunt, R. C.....Fairmont
Hunt, V. C.....Rochester
Hunte, A. F.....Truman
Hursh, M. M.....Grand Rapids
Huxley, F. R.....Faribault
Hvoslef, Jakob .....
International Falls
Hynes, James .....Minneapolis
Hynes, John E.....Minneapolis
Ide, A. W.....St. Paul
Ikeda, Kano .....Minneapolis
Ingerson, C. A.....St. Paul
Irvine, H. G.....Minneapolis
Jacobs, A. C.....Elmore
Jacobs, John C.....Willmar
Jacobson, David J.....Russell
Jacquot, G. L.....Tyler
James, J. H.....Mankato
Jamieson, Earl ...Walnut Grove
Jellison, E. R.....New Auburn
Jennings, Mary H...Minneapolis
Jensen, J. C.....Hendricks
Jensen, M. J.....Minneapolis
Jensen, T. J.....Duluth

Jepson, P. N.....Rochester
Jesion, J. W.....St. Paul
Joannides, Minas ....Minneapolis
Johnson, A. C.....Rochester
Johnson, A. E.....Minneapolis
Johnson, A. E.....Red Wing
Johnson, A. Elof.....Minneapolis
Johnson, Asa M.....St. Paul
Johnson, C. M.....Dawson
Johnson, Ellsworth .....Windom
Johnson, E. W.....Bemidji
Johnson, Hartland C.....St. Paul
Johnson, H. M.....Dawson
Johnson, Henry Peter..Rochester
Johnson, H. P.....Fairmont
Johnson, James A....Minneapolis
Johnson, Julius .....Minneapolis
Johnson, Nimrod A...Minneapolis
Johnson, O. V.....Sebeka
Johnson, Odin J.....Minneapolis
Johnson, R. A.....Minneapolis
Johnson, T. H.....St. Paul
Jones, A. W.....Red Wing
Jones, D. C.....St. Paul
Jones, E. M.....St. Paul
Jones, H. T.....Rochester
Jones, H. W.....Minneapolis
Jones, Richard N.....Richmond
Jones, W. A.....Minneapolis
Josewich, Alexander..Minneapolis
Josewski, R. J.....Stillwater
Joyce, G. T.....Rochester
Judd, E. S.....Rochester
Juergens, H. M.....Belle Plaine
Kahala, Arthur .....Crookston
Kalinoff, D. .....Stillwater
Kamman, Gordon R.....St. Paul
Kamp, B. A.....Albert Lea
Kannary, E. L.....St. Paul
Kanne, C. W.....Faribault
Karn, B. R.....Ortonville
Kaufman, A. J.....Franklin
Kaufman, Wm. C.....Appleton
Kean, N. D.....Coleraine
Keeling, Louis F.....Lakefield
Keith, N. M.....Rochester
Kelly, B. W.....Aitkin
Kelly, John V.....St. Paul
Kelly, Paul H.....St. Paul
Kelly, Thomas C.....Mankato
Kelsey, C. G.....Hinckley
Kemp, A. F.....Mankato
Kennedy, C. C.....Minneapolis
Kennedy, Jane F.....Minneapolis
Kennedy, Roger L. J...Rochester
Kennedy, R. Ray....Minneapolis
Kennedy, W. A.....St. Paul
Kenny, H. F.....St. Paul
Kenyon, Paul .....Wadena
Kerian, S. Z.....Aitkin
Kern, M. J.....St. Cloud
Kernohan, J. W.....Minneapolis
Kesting, Herman .....St. Paul
Keyes, C. R.....Duluth
Keyes, E. D.....Winona
Kibbe, O. A.....Canton
Kiefer, M. A.....Sleepy Eye
Kierland, P. E.....Alexandria
Kiesling, I. H.....Nashwauk
Kilbourne, M. F.....Rochester
Kilbride, J. S.....Canby
Kilfoy, Edward Joseph..Rochester
Kilgore, Allen M.....Rochester
Kilgore, F. H.....Rochester
Killins, Wendell A....Rochester
Kimball, H. H.....Minneapolis
King, E. A.....Minneapolis
King, W. I.....Albert Lea
King, W. R.....Minneapolis
King, W. S.....Eveleth
Kingsbury, E. M.....Clearwater
Kirk, G. P....East Grand Forks
Kistler, A. S.....St. Paul
Kistler, C. M.....Minneapolis
Kittelson, Olaf .....Minneapolis
Kittelson, T. N.....Fergus Falls
Kjelland, J. S.....
East Ellsworth, Wis.
Klaveness, E. .....Monticello
Klein, Harry .....Duluth
Klein, H. N.....St. Paul
Klima, W. W.....Stewart
Knapp, F. N.....Duluth
Knauff, M. K.....St. Paul
Knight, H. L.....Minneapolis
Knight, Mary S.....Rochester
Knight, Ralph T.....Minneapolis
Knight, Ray Roberts..Minneapolis
Knudtson, H. M.....Browerville
Koch, John Charles..Minneapolis
Kohlbry, C. O.....Duluth
Kohler, D. W.....St. Joseph
Kohler, F. G.....Minneapolis
Kohler, G. A.....Minneapolis
Koller, Herman M....Minneapolis
Koller, L. R.....Minneapolis
Kolset, Carl D.....Benson
Kooiker, Herman J.....Hills
Kraft, Peter .....Duluth
Kremer, Walter J....Minneapolis
Kretzschmar, Karl E.....
Los Angeles, Cal.
Kriedt, Daniel .....Minneapolis
Kucera, Wm. J.....Minneapolis
Kuhlman, Aug. .....Melrose
Kusske, A. L.....New Ulm
Kuth, J. R.....Duluth
Kvitrud, G. .....Minneapolis
Laird, A. T.....Nopeming
Lajoie, John M.....Minneapolis
Landeen, F. G.....Stillwater
Lane, Laura A.....Minneapolis
Laney, R. L.....Puposky
Langenderfer, F. V.....St. Paul
Langhoff, A. H.....Glencoe
Lannin, J. C.....Mabel
LaPierre, C. A.....Minneapolis
Lapp, Victor Ray.....Rochester
Larsen, C. L.....St. Paul
Larson, A. L.....Fertile
Larson, M. L.....St. Paul
Larson, O. O.....Detroit
Latchford, James Kyran.....
Rochester
Laurent, A. A.....Minneapolis
La Vake, R. T.....Minneapolis
Law, A. A.....Minneapolis
Leahy, Bartholomew ....St. Paul
Leavenworth, Richard O.....
St. Paul
Leavitt, H. H.....Minneapolis
Lebowski, Joseph A..Minneapolis
Leck, Clifford C.....Austin
LeClerc, J. E.....Le Sueur
Lee, H. M.....Minneapolis
Lee, J. L.....Watertown
Lee, John W.....Minneapolis
Lee, W. A.....Fergus Falls
Lee, Walter N.....Madison
Lee, W. P.....Northfield
Lubens, J. H.....Lismore
Leech, Charles Hoyt...Rochester
Leibold, H. H....Parkers Prairie
Leicht, O. .....Winona
Leitch, Archibald .....St. Paul
Leland, John T.....Herman
Leland, M. N.....Minneapolis
Lemon, W. S.....Rochester
Lemstrom, Jarl .....Minneapolis
Lenont, C. B.....Virginia
Leonard, L. J.....Minneapolis
Leopard, B. A.....New Richland
Lepak, F. J.....Duluth
Lepak, John A.....St. Paul
Lerche, William .....St. Paul
Leuty, Amos .....Morris
Lewis, A. J.....Henning
Lewis, C. B.....St. Cloud
Lewis, E. J.....Sauk Center
Lewis, J. B.....So. St. Paul
Lewis, W. W.....St. Paul
Lexa, F. J.....Lonsdale
Libert, John N.....St. Cloud
Lichtenstein, H. .....Winona
Lick, C. Louis.....St. Paul
Liedloff, A. G.....Mankato
Lillie, H. I.....Rochester
Lillie, W. I.....Rochester
Lima, Ludvig .....Montevideo
Lind, C. J.....Minneapolis
Lindberg, A. I.....Wheaton
Linde, Herman .....Cyrus
Lindgren, E. I.....Duluth
Lindsay, W. V.....Winona
Linton, W. B.....Rochester
Lippman, Hyman S...Minneapolis
List, Walter E.....Minneapolis
Litchfield, John T....Minneapolis
Litman, Samuel N...Meadowlands
Little, W. J.....St. Paul
Litzenberg, J. C.....Minneapolis
Lloyd, H. J.....Mankato
Locken, O. E.....Crookston
Logan, A. H.....Rochester
Logan, F. W.....Blue Earth
Logefeil, Rudolph C..Minneapolis
Lommen, P. A.....Austin
Long, Jesse .....Minneapolis
Long, W. H.....Rochester
Loofbourrow, E. H....Keewatin
Loomis, E. A.....Minneapolis
Love, Fred A.....Carlos
Love, Geo. A.....Preston
Lowe, L. M.....Glyndon
Lowe, Thos. .....Pipestone
Luden, Georgine .....Rochester
Luedtke, G. H.....Fairmont
Lum, C. E.....Duluth
Lundgren, A. C.....Minneapolis
Lundholm, A. M.....St. Paul
Lundy, John S.....Rochester
Lyday, R. O.....Rochester
Lyman, F. V.....Grove City
Lynch, M. J.....Minneapolis
Lyng, John A.....Minneapolis
Lynn, J. F.....Waseca
Lysne, Henry .....Minneapolis
McBroom, D. E.....Faribault
McCann, D. F.....Bemidji
McCann, G. E.....Onamia
McCarthy, Donald ..Minneapolis
McCarthy, W. J.....Madelia
McCarthy, W. R.....St. Paul
McCartney, James S..Minneapolis
McClanahan, J. H....White Bear
McClanahan, T. S....White Bear
McCloud, C. N.....St. Paul
McComb, C. F.....Duluth
McCoy, Mary .....Duluth
McCrea, James .....Fulda
McDaniel, Orianna ..Minneapolis
McDavitt, Thos. .....St. Paul
McDonald, A. L.....Duluth
McDougald, D. W....Minneapolis
McDowell, J. P.....St. Cloud
McEachran, A.....Minneapolis
McFarland, A. H.....Minneapolis
McGandy, R. F.....Minneapolis
McGiffert, E. N.....Duluth
McGroarty, J. J.....Easton
McGuigan, H. T.....Red Wing
McHaffie, O. L.....Duluth
McHugh, Roderick F.....Aitkin
McIntire, H. M.....Waseca
McIntyre, E. H.....Virginia
McIntyre, Geo. .....Minneapolis
McIntyre, John A.....Owatonna
McKaig, Carle B.....Pine Island
McKenna, J. K.....Austin
McKeon, James .....St. Paul
McKeon, Owen .....St. Paul
McKeown, E. G.....Pipestone
McKibben, H. E.....St. Cloud
McKinley, C. A.....Minneapolis
McKinley, J. C.....Minneapolis
McKinney, F. S.....Minneapolis
McKinnon, J. J.....Wadena
McLaren, Jennette M.....St. Paul
McLaughlin, E. M.....Winona
McLaughlin, Jos. A..Minneapolis
McMurtrie, W. B.....Marble
McMurtry, Walter C.....Virginia
McNevin, C. F.....St. Paul
McNutt, John R.....Two Harbors
McPheeters, H. O....Minneapolis
McGuiggan, Mark Ronald.....
Rochester
McVicar, Chas. S.....Rochester
MacDonald, A. E.....Minneapolis
MacDonald, D. A.....Minneapolis
MacDonald, Irving C.....
Minneapolis
Macnie, J. S.....Minneapolis
Madsen, Leo John.....Rochester
Maertz, W. F.....New Prague
Magath, T. B.....Rochester
Magie, W. H.....Duluth
Magney, F. H.....Duluth
Mahle, A. E.....Rochester
Maland, C. O.....Minneapolis
Malloy, J. F.....Rochester
Maloney, T. J.....St. Paul
Manley, J. R.....Duluth
Mann, A. T.....Minneapolis
Manson, F. M.....Worthington
Marcley, W. J.....Minneapolis
Mariette, Ernest .....Hopkins
Mark, D. B.....Minneapolis
Marquis, W. James....Rochester
Marsh, Fred Eugene...Rochester
Martin, B. J.....Bemidji
Martin, T. R.....Duluth
Martineau, J. L.....St. Paul
Masson, D. M.....Rochester
Masson, J. C.....Rochester
Matchan, Glen R.....Minneapolis
Mathews, Justus ....Minneapolis
Mattson, R. H.....Stephen
Maxelner, Stanley R..Minneapolis
May, C. C.....Adrian
May, W. H.....Minneapolis
Mayfield, A. L.....Rochester
Mayland, M. L.....Faribault

Mayo, C. H.....Rochester
Mayo, W. J.....Rochester
Maytum, Charles K....Rochester
Mead, Marion .....Minneapolis
Meckstroth, C. W.....Brandon
Mee, P. H.....Osseo
Meierding, Wm. A.....Springneld
Meilicke, W. A.....Nicollet
Meland, O. N.....Warren
Melby, Benedik.Blooming Prairie
Mellby, O. F....Thief River Falls
Melson, Oliver C.....Rochester
Melzer, G. R.....Lyle
Mentzer, Stanley H....Rochester
Merkert, Charles E...Minneapolis
Merkert, G. L.....Minneapolis
Merrill, E. Forrest....Rochester
Merrill, J. E.....Amboy
Merriman, L. L.....Duluth
Mesker, G. H.....Olivia
Metcalf, F. W.....Fulda
Meyer, A. A.....Melrose
Meyer, E. L.....Minneapolis
Meyer, P. S.....Belle Plaine
Meyerding, E. A.....St. Paul
Meyerding, H. W.....Rochester
Michael, J. C.....Minneapolis
Michelson, H. E.....Minneapolis
Milan, M. Geo.....Warren
Miller, F. C.....Minneapolis
Miller, H. A.....Waseca
Miller, V. I.....Mankato
Miller, W. A.....New York Mills
Miller, Walter H.....Buhl
Mills, J. L.....Winnebago City
Millspaugh, J. G....Little Falls
Miners, G. A.....Deer River
Mingo, F. E.....Hugo
Mitchell, A. B.....Hector
Mitchell, Frederick .....St. Paul
Mitchell, R. S.....**Grand Meadow**
Moersch, F. P.....Rochester
Moersch, H. J.....Rochester
Moffatt, A. G.....Howard Lake
Moir, Wm. W.....Minneapolis
Molander, H. A.....St. Paul
Moloney, G. R.....Belle Plaine
Monroe, P. B.....Soudan
Moore, A. B.....Rochester
Moorhead, M. B.....Minneapolis
More, C. W.....Eveleth
Morell, W. N.....Verndale
Moren, Edwin .....Minneapolis
Moriarity, Cecile R...Minneapolis
Mork, B. O.....Worthington
Morley, G. A.....Crookston
Morris, Francis J.....Prior Lake
Morris, R. Edwin.....St. Paul
Morrison, A. W.....Minneapolis
Morrissey, F. B.....St. Paul
Morrow, James J.....Austin
Morse, Harry Dodge...Rochester
Morse, John .....Minneapolis
Morse, M. P.....Le Roy
Morse, W. E. H.....Morristown
Morsman, L. W.....Hibbing
Morss, C. R.....Zumbrota
Mortenson, N. G.....St. Paul
Morton, Chas. Bruce...Rochester
Morton, H. McI.....Minneapolis
Moses, Joseph, Jr.....Northfield
Moss, Myer N.....St. Paul
Mayer, Ralph E.....Bemidji
Moynihan, A. F.....Sauk Center
Moynihan, T. J.....St. Paul
Muhme, Norman Benedict.....
Rochester
Murphy, E. F.....St. Paul
Murphy, F. J.....Minneapolis
Murray, D. D.....Duluth
Murray, W. R.....Minneapolis
Mussey, R. D.....Rochester
Myers, J. A.....Minneapolis
Myers, Thos. .....St. Paul
Naegeli, Frank ....Fergus Falls
Nagel, G. W.....Rochester
Nannestad, J. R.....Albert Lea
Nannestad, R. F.....Lanesboro
Nass, H. A.....Mabel
Nathanson, M. H....Minneapolis
Nauth, W. W.....Winona
Neal, J. M.....Minneapolis
Neher, F. H.....St. Paul
Nelson, C. P.....Owatonna
Nelson, E. H.....Chisholm
Nelson, H. E.....Crookston
Nelson, H. S.....Minneapolis
Nelson, L. A.....St. Paul
Nelson, Marque O.....Rochester
Nelson, M. S.....Granite Falls
Nelson, Nesmuth .....Brainerd
Nelson, O. E.....Minneapolis
Nelson, O. N.....Battle Lake
Nerad, Anton H.....Argyle
Nesbit, Harold T.....Rochester
Neumann, C. A.....Lewiston
Neumann, W. H..Sheboygan, Wis.
New, G. B.....Rochester
Newhart, Horace ...Minneapolis
Newman, G. A.....Stillwater
Nicols, A. E.....St. Paul
Nicholson, J. .....Brainerd
Nicholson, M. A.....**Duluth**
Nippert, H. T.....St. Paul
Nippert, L. A.....Minneapolis
Noble, Thomas P.....Rochester
Noonan, Dan F.....Minneapolis
Nootnagel, C. F.....Minneapolis
Noran, A. N.....Minneapolis
Nordin, C. G.....Brainerd
Nordin, G. T.....Minneapolis
Nordland, Martin ...Minneapolis
Norman, J. F.....Crookston
Norris, Edgar H.....St. Paul
Norrgard, H. T.....Milaca
Norris, G. H.....Annandale
Noth, H. W.....Minneapolis
Novak, E. E.....New Prague
Nusbaum, D. H..Storm Lake, Ia.
Nye, Katherine A.....St. Paul
Nye, Lillian L.....St. Paul
O'Brien, H. J.....St. Paul
O'Connor, D. C.....Eden Valley
O'Connor, I. A.....St. Paul
O'Connor, J. P.....St. Paul
O'Connor, J. V.....St. Paul
O'Connor, Patrick H.....Amboy
O'Donnell, D. M.....Ortonville
O'Donnell, J. E.....Minneapolis
O'Hara, J. J.....Janesville
O'Leary, P. A.....Rochester
Oberg, C. M.....Minneapolis
Ocksenhirt, Norman C..Rochester
Oerting, Harry .....St. Paul
Offutt, Susan R.....Rochester
Ogden, Warner .....St. Paul
Ohage, Justus .....St. Paul
Ohage, Justus, Jr.....St. Paul
Ohlinger, L. B.....Minneapolis
Ohnstad, J. L.....McIntosh
Oliver, C. I.....Graceville
Olson, Albert E.....Duluth
Olson, Chas. A.....St. Paul
Olson, Ernest A.....Pine Island
Olson, F. A.....Minneapolis
Olson, G. M.....Minneapolis
Olson, Olof A.....Minneapolis
Olson, O. S.....**Duluth**
Olson, R. G.....Minneapolis
Olson, W. P.....Gaylord
Omohundro, Miles Parker.....
Rochester
Onsgard, C. K.....Halstad
Onsgard, L. K.....Houston
Opheim, O. V.....Starbuck
Oppegaard, C. L.....Crookston
Oppegaard, M. O.....Crookston
Oredson, O. A.....Duluth
Osborn, Lida .....Mankato
Osburn, B. F..International Falls
Ostergren, E. W.....St. Paul
Otto, H. C.....Frazee
Overend, K. V.....Hallock
Owre, Oscar .....Minneapolis
Pake, S. G.....Duluth
Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Paradine, J. .....Duluth
Parker, B. R.....Rochester
Parker, H. L.....Rochester
Parker, J. William.....Rochester
Parker, O. W.....Ely
Parker, Stephen Thomas.....
Rochester
Parks, A. H.....Minneapolis
Parrott, B. W.....Long Prairie
Parson, L. R.....Elbow Lake
Passer, A. A.....Olivia
Patterson, W. E.....Westbrook
Patterson, W. L.....Fergus Falls
Paulsen, E. L.....Minneapolis
Paulson, C. W.....North Branch
Paulson, T. S.....Fergus Falls
Payette, C. H.....Duluth
Pearce, N. O.....Minneapolis
Pearson, F. R.....St. Paul
Pedersen, A. H.....St. Paul
Pederson, Harold ...Minneapolis
Pederson, O. J.....Hanska
Pederson, R. M.....Minneapolis
Patterson, W. E.....Minneapolis
Pemberton, J. de J....Rochester
Pengelly, E. J.....Crosby
Penhall, F. W.....Morton
Pennie, D. F.....Duluth
Peppard, T. A.....Minneapolis
Perley, A. E.....Chisholm
Perry, Clayton Chas....Rochester
Perry, C. G.....St. Paul
Perry, Ralph St. John.....
Minneapolis
Persons, C. E.....Marshall
Peterman, M. G.....Rochester
Peters, R. M.....Minneapolis
Petersen, J. R.....Minneapolis
Petersen, Thorvold ..Minneapolis
Peterson, A. A.....Mora
Peterson, Alfred .....Dassel
Peterson, Christian....Owatonna
Peterson, H. E.....Granite Falls
Peterson, O. H.....Minneapolis
Peterson, O. L.....Cokato
Peterson, R. A.....Vesta
Peterson, V. N.....St. Paul
Peterson, Willard C..Minneapolis
Pettit, C. W.....Minneapolis
Peyton, Wm. T.....Minneapolis
Pfaff, E. K.....Shoals, Ind.
Phelps, Kenneth A...Minneapolis
Phelps, R. M.....St. Peter
Phillips, A. E.....Delano
Phillips, W. H.....Jordan
Pierson, Claude M.....Wheaton
Pilon, P. C.....Paynesville
Pine, Auten A.....St. Paul
Pineo, W. B.....Minneapolis
Piper, M. C.....Rochester
Piper, Wm. A.....Mountain Lake
Plankers, A. G.....Rochester
Platt, J. J.....St. Paul
Platou, E. S.....Minneapolis
Plondke, F. J.....St. Paul
Plonske, C. J.....Faribault
Plummer, H. S.....Rochester
Plummer, W. A.....Rochester
Poehler, F. T.....Minneapolis
Poirier, J. A.....Forest Lake
Pollock, L. W.....Rochester
Poppe, Fred H.....Minneapolis
Portman, W. C.....Jackson
Potter, James Craig...Rochester
Powell, L. D.....Rochester
Power, J. E.....Duluth
Powers, F. W.....Barrett
Prangen, A. D.....Rochester
Pratt, Fred J.....Minneapolis
Pratt, J. A.....Minneapolis
Preine, I. A.....Minneapolis
Prickman, Louis Elwood.....
Rochester
Prim, J. A.....Minneapolis
Pritchard, D. B.....Winona
Proshek, Charles E...Minneapolis
Puffer, F. L.....Bird Island
Pulford, DeLos Schuyler, Jr...
Rochester
Putney, G. E.....Paynesville
Quigley, T. C.....Owatonna
Quimby, Thomas F...Minneapolis
Quist, H. W.....Minneapolis
Raadquist, C. S......Hibbing
Radabaugh, R. C.....Hastings
Radtke, H. P.....Chisholm
Raihala, John .....Virginia
Rains, J. M.....Willmar
Raiter, Franklin W. S....Cloquet
Raiter, Roy F.....Cloquet
Ramsey, W. R.....St. Paul
Randall, B. M.....Graceville
Randall, Lawrence Merrill....
Rochester
Ransom, L. M.....Hancock
Ratcliffe, J. J.....Aitkin
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Reed, Chas. A.....Minneapolis
Rees, S. P.....Minneapolis
Reeve, E. T.....Elbow Lake
Regnier, E. A.....Minneapolis
Reid, J. Spence.....Rochester
Reineke, George F.....New Ulm
Reiter, H. W.....Shakopee
Replogle, W. H.....Wabasha
Reynolds, Hugh .....Hibbing
Reynolds, J. S.....Minneapolis
Rhines, D. C.....Caledonia
Rice, G. D.....St. Cloud
Richards, E. T. F.....St. Paul
Richardson, Fred S....Belgrade
Richardson, Harold E...St. Paul
Richardson, W. E.....Pipestone
Richardson, W. J.....Fairmont
Richdorf, L. F.....Minneapolis

Richmond, Chas. D.....Jeffers
Ridgeway, Alexander...Belgrade
Ridgway, A. M.....Annandale
Riggs, C. E.....St. Paul
Rigler, Leo G.....Minneapolis
Rippert, J. A.....Duluth
Rishmiller, J. H.....Minneapolis
Risjord, J. N.....Fertile
Risser, E. D.....Winona
Ritchie, H. P.....St. Paul
Rivers, A. B.....Rochester
Rizer, R. I.....Minneapolis
Roadman, I. M.....Ponsford
Roan, Carl M.....Minneapolis
Robb, Edwin F.....Minneapolis
Robbins, C. P.....Winona
Roberts, L. M.....Little Falls
Roberts, Thos. S.....Minneapolis
Roberts, W. B.....Minneapolis
Robertson, A. W.....Litchfield
Robertson, H. E.....Rochester
Robertson, J. B.....Cottonwood
Robertson, W. P.....Litchfield
Robilliard, C. M.....Faribault
Robilliard, W. H.....Faribault
Robinson, J. M.....Duluth
Robitshek, E. C.....Minneapolis
Rochford, W. E.....Minneapolis
Rockwood, Paul Reed..Rochester
Rodda, F. C.....Minneapolis
Rodgers, C. L.....Minneapolis
Roehlke, A. B.....Elk River
Rogers, John T.....St. Paul
Roholt, C. L.....Waverly
Rohwer, Christian Jacob.....
Rochester
Rood, D. C.....Hibbing
Rose, J. T.....Lakefield
Rosen, S.....Minneapolis
Rosenberry, B. P.....Winona
Rosenow, E. C.....Rochester
Rosenwald, R. M.....Minneapolis
Rosseau, Victor.....Maple Lake
Rothenberg, J. C.....Springfield
Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Rowe, O. W.....Duluth
Rowe, Paul H.....Minneapolis
Rowntree, L. G.....Rochester
Roy, J. A.....Red Lake Falls
Roy, Philemon.....St. Paul
Rudell, Gustave .....Minneapolis
Ruud, Henry O.....Minneapolis
Rudie, P. S.....Duluth
Ruhberg, George N.....St. Paul
Rumpf, C. W.....Faribault
Rumpf, W. H.....Faribault
Runnerstrom, Geo. E.....
Minneapolis
Rutherford, W. C.....St. Paul
Rutledge, L. H.....Detroit
Ryan, John J.....St. Paul
Ryan, J. W.....Duluth
Saar, W. G.....Hutchinson
Sager, William Warren.....
Rochester
Sanderson, A. G....Granite Falls
Sanderson, E. T.....Minneota
Sanford, A. H.....Rochester
Sargeant, H. L.....Fergus Falls
Satersmoen, Theo. .....
Pelican Rapids
Sather, Allen .....Fosston
Sather, E. R.....Alexandria
Satterlund, Victor .....St. Paul
Savage, F. J.....St. Paul
Sawatzky, Wm. A....Minneapolis
Sawyer, H. P.....Goodhue
Schaaf, F. H. K.....Minneapolis
Schaefer, S. .....Winona
Schatz, F. J.....St. Cloud
Schefcik, J. F.....Minneapolis
Scheldrup, N. H.....Minneapolis
Scherer, C. A.....Duluth
Schlesselman, George .....
Good Thunder
Schlesselman, J. T.....Mankato
Schlutz, Fred W.....Minneapolis
Schmidt, P. A.....Mapleton
Schmidt, W. R.....Glencoe
Schmitt, A. F.....Minneapolis
Schmitt, Earl O. G.....Rochester
Schmitt, S. C.....Minneapolis
Schnanenberger, G. .....
Rollingstone
Schneider, H. A.....Jordan
Schneider, J. P.....Minneapolis
Schoch, J. L.....New Ulm
Schoch, R. B.....St. Paul
Scholpp, O. W.....Hutchinson
Schons, E. .....St. Paul
Schottler, G. J.....Dexter
Schroeder, C. H.....Duluth
Schuldt, F. C.....St. Paul
Schultz, J. A.....Albert Lea
Schulz, Irwin .....Rochester
Schulze, Albert A.....St. Paul
Schussler, Otto F.....Minneapolis
Schwartz, A. H.....Duluth
Schwartz, Virgil .....Minneapolis
Schwyzer, Arnold .....St. Paul
Schwyzer, Gustav ...Minneapolis
Scofield, C. L.....Benson
Scott, J. W.....St. Charles
Seaberg, J. A.....Minneapolis
Seashore, D. E.....Duluth
Seashore, Gilbert ...Minneapolis
Seham, Max .....Minneapolis
Seifert, Otto J.....New Ulm
Selleseth, Iver .....Minneapolis
Senkler, G. E.....St. Paul
Senn, E. W.....Owatonna
Sessions, John .....Minneapolis
Shaleen, A. W.....Hallock
Shannon, S. S.....Crosby
Shannon, W. Ray.....St. Paul
Shapere, A. D.....St. Paul
Shapiro, E. Z.....Duluth
Shaw, A. W.....Buhl
Shedlov, A. .....Gully
Sheldon, W. D.....Rochester
Shelland, J. T.....Ada
Shellman, John L.....St. Paul
Shelver, H. J.....Ortonville
Sheppard, Fred .....Hutchinson
Sheppard, P. E.....Hutchinson
Sherman, C. H.....Bayport
Sherman, C. L.....Luverne
Sherman, H. T.....Franklin
Sherping, O. Theo...Fergus Falls
Sherwood, G. E.....Kimball
Shillington, M. A.....St. Paul
Shimonek, Anton .....St. Paul
Shipley, H. M.....Adams
Shrader, E. E.....Watertown
Shrader, J. S.....Springfield
Shulean, Nellie S.....Cambridge
Silvernail, F. .....Elmore
Simison, C. W.....Hawley
Simon, B. F.....St. Paul
Simon, Geo. H.....St. Paul
Simon, Harold Ewart..Rochester
Simons, Jaimar .....Minneapolis
Simpson, E. D.....Minneapolis
Simpson, J. D.....Minneapolis
Sistrunk, W. E.....Rochester
Sivertsen, Andrew ..Minneapolis
Sivertson, Ivar .....Minneapolis
Skinner, H. O.....St. Paul
Slater, S. A.....Worthington
Slocumb, J. A.....Plainview
Slocumb, Maude S..Minneapolis
Slyfield, F. F.....Duluth
Smallwood, J. T.....Worthington
Smersh, F. M.....Owatonna
Smersh, J. F.....Owatonna
Smith, A. M.....Minneapolis
Smith, B. A.....Crosby
Smith, B. F.....St. Peter
Smith, C. M.....Duluth
Smith, E. H.....Bemidji
Smith, F. D.....Kasson
Smith, F. L.....Rochester
Smith, William H.....Cass Lake
Smith, Homer R.....Minneapolis
Smith, L. G.....Montevideo
Smith, M. W.....Red Wing
Smith, Norman M....Minneapolis
Smith, P. A.....Faribault
Snell, Albert M.....Rochester
Snyder, G. W.....St. Paul
Soderlind, A. .....Minneapolis
Sogge, L. .....Windom
Sohlberg, Olof .....St. Paul
Sohmer, A. E.....Mankato
Solhaug, S. B.....Minneapolis
Souba, Fred J.....Minneapolis
Spicer, F. W.....Duluth
Sprafka, J. M.....St. Paul
Spratt, C. N.....Minneapolis
Spurzem, R. J.....Anoka
Stacy, L. J.....Rochester
Staley, J. C.....St. Paul
Stangl, Fred .....St. Cloud
Stangl, Phillip E.....St. Cloud
Stanley, C. R.....Worthington
Staples, H. L.....Minneapolis
Stark, W. B.....Rochester
Steen, A. H.....Cottage Grove
Steffens, L. A.....Red Wing
Steiner, I. W.....Winona
Stemsrud, A. A.....Dawson
Sterner, E. G.....St. Paul
Sterner, O. W.....St. Paul
Steven, Geo. .....Byron
Stevens, F. A.....Lake Elmo
Stevens, J. B.....Rochester
Stevens, John .....Gonvick
Stewart, A. B.....Owatonna
Stewart, Alexander .....St. Paul
Stewart, C. A.....Minneapolis
Stewart, R. I.....Lindstrom
Stierle, Adolph, Jr.....St. Paul
Stillwell, W. C.....Mankato
Stinnette, S. E.....St. Paul
Stinson, John Wesley..Rochester
Stocking, Fred F.....Milaca
Stolpestad, H. L.....St. Paul
Stomel, Joseph .....Minneapolis
Stowe, A. J.....Rush City
Strachauer, A. C.....Minneapolis
Strathern, F. P.....St. Peter
Strathern, M. L.....Gilbert
Stratte, A. K.....Pine City
Strickler, A. F.....Sleepy Eye
Strickler, Mary .....Sleepy Eye
Strickler, O. C.....New Ulm
Strobel, W. G.....Duluth
Strout, E. S.....Minneapolis
Strout, G. Elmer.....Minneapolis
Stuart, A. B.....Cloquet
Stuhr, Henry C.....Minneapolis
Stuhr, J. W.....Stillwater
Sturges, C. J.....Buffalo
Sturre, J. R.....Watkins
Sukeforth, L. A.....Duluth
Sundt, M. .....Minneapolis
Sutherland, C. G.....Rochester
Sutherland, H. N.....Ely
Sutton, Chas. S.....St. Cloud
Sutton, L. F.....Mazeppa
Swan, Theo. S.....Rochester
Swanson, Edwin O.....St. Paul
Swanson, John A.....St. Paul
Swanson, Roy E.....Minneapolis
Swartwood, F. A.....Waseca
Swedenberg, A. W.....
Thief River Falls
Sweeney, Arthur .....St. Paul
Sweatman, R. H.....Sauk Center
Sweetser, H. B.....Minneapolis
Sweetser, H. B. J.....Minneapolis
Sweetser, Theodore..Minneapolis
Sweitzer, S. E.....Minneapolis
Swendseen, Carl J....Minneapolis
Swendson, J. J.....St. Paul
Swennes, O. S.....Wahkon
Swenson, Charles .....Braham
Swezey, B. F.....Buffalo
Sybilrud, H. W.....Bricelyn
Synhoist, Alfred Paul..Rochester
Taft, John O.....Minneapolis
Taft, Walter L.....Minneapolis
Tanner, A. C.....Minneapolis
Tanquist, E. J.....Alexandria
Taylor, H. L.....St. Paul
Taylor, Rood .....Minneapolis
Taylor, Wm. J.....Pipestone
Teisberg, C. B.....St. Paul
Tennyson, Theo.....Minneapolis
Ternstrom, O. H.....Minneapolis
Thabes, J. A.....Brainerd
Thairwald, C. C.....St. Paul
Theissen, W. N.....Faribault
Thimsen, N. C...Blooming Prairie
Thomas, David Owen.....
Minneapolis
Thomas, Geo. E.....Minneapolis
Thomas, Geo. H.....Minneapolis
Thomas, Gilbert J....Minneapolis
Thompson, Albert .....St. James
Thompson, J. W.....Rochester
Thompson, V. C.....
Marine-on-St. Croix
Thordarson, Theo. .....Minneota
Thoresen, H.....Brooklyn, N. Y.
(The Norwegian-America Line,
Pier Foot of 30th St.)
Thornby, H. J.....Moorhead
Trutna, Thos. J.....Silver Lake
Tregilgas, H. R.....St. Paul
Thorson, E. O.....Luverne
Thysell, F. A.....Moorhead
Tibbetts, M. H.....Duluth
Tiber, L. J.....St. Paul
Tiedeman, I. D.....Heron Lake
Tierney, C. M.....Granger
Tilderquist, D. L.....Duluth
Tilton, Albert J.....Alden
Tingdale, A. C.....Minneapolis
Tofte, Josephine .....Fisher
Torkelson, P. T.....Lyle
Towers, F. E.....Minneapolis

Towsend, D. .....Brooten
Traeger, C. A.....Faribault
Tunstead, Hugh J...Minneapolis
Tuohy, E. L.....Duluth
Turnacliff, D. D.....Minneapolis
Turnbull, F. M.....Duluth
Twerdy, G. .....Winona
Tyrrell, C. C.....Minneapolis
Ulrich, Henry L.....Minneapolis
Underhill, Marshall Scott.....
Rochester
Undine, A. Clyde.....Minneapolis
Urberg, S. E.....Duluth
Utley, J. O.....Montrose
Vadheim, A. L.....Tyler
Vail, James B.....Henning
Valentine, W. H.....Tracy
Van Norman, K. H.....St. Paul
Van Slyke, Chas. A.....St. Paul
Van Valkenburg, B. F.....
Long Prairie
Vercellini, C. E.....Duluth
Vigen, J. G.....Fergus Falls
Vinson, P. P.....Rochester
Vogel, Joseph H.....New Ulm
Vogtel, Melvin A.....Minneapolis
Vollum, E. O.....Albert Lea
Von Berg, J. P.....Albert Lea
Vonder Weyer, Wm.....St. Paul
Von Lachum, W. H....Rochester
Voger, Emile O.....Minneapolis
Vrooman, F. E.....St. Francis
Waas, Charles William...St. Paul
Wagener, H. P.....Rochester
Wald, R. H.....St. Paul
Waldie, Geo. McL.....Wabasha
Waldron, Carl W.....Minneapolis
Walker, A. E.....Duluth
Walker, C. C.....Lamberton
Walker, G. H.....
Spital Grasse 21 Wien, Austria
Walker, R. E.....St. Paul
Waller, Jas. D.....Wilmont
Wallinga, John H.....St. Paul
Walters, B. Frank.....St. Paul
Walters, F. R.....Moose Lake
Walters, H. W.....Rochester
Wanous, E. Z.....Minneapolis
Ward, A. W.....Minneapolis
Ward, Percy A.....Minneapolis
Warham, J. J.....Minneapolis
Warner, E. F.....St. Paul
Warnock, R. W.....St. Paul
Warren, C. L.....Le Roy
Warren, E. L.....St. Paul
Warren, F. S.....Faribault
Warren, J. W.....Faribault
Warwick, Margaret.....St. Paul
Watson, A. M.....Royalton
Watson, C. W.....Minneapolis
Watson, F. G.....Worthington
Watson, J. A.....Minneapolis
Watson, John D.....Holdingford
Watson, N. M.....Red Lake Falls
Watson, Tolbert .....Albany
Wattam, G. S.....Warren
Way, O. F.....Claremont
Webb, R. C.....Minneapolis
Webber, E. E.....Proctor
Webber, Isaac M.....Rochester
Webster, H. E.....Duluth
Weeks, L. C.....Detroit
Weir, J. D.....Beardsley
Weir, J. F.....Rochester
Weirick, Howard R.....Hibbing
Weiser, F. R.....Windom
Weiser, George.....New Ulm
Weisman, S. A.....Minneapolis
Welch, M. C.....St. Paul
Welles, H. J.....Minneapolis
Wellcome, J. W. B....Sleepy Eye
Wentworth, A. J.....Mankato
Werner, N. L.....Red Wing
Werner, O. S.....St. Hilaire
Westby, Nels .....Madison
Wethall, A. G.....Minneapolis
Weum, T. Wm.....Minneapolis
Wheeler, M. W.....St. Paul
Whetstone, Mary S...Minneapolis
Whitacre, J. C.....St. Paul
Whitcomb, Ed. H.....St. Paul
White, J. S.....St. Paul
White, S. .....Minneapolis
Whitmore, F. W.....St. Paul
Whitney, A. W.....St. Paul
Widen, W. F.....Minneapolis
Wilcox, Archa .....Minneapolis
Wilcox, F. L.....Walker
Wilcox, M. Russell...Minneapolis
Wilder, R. M.....Rochester
Wilkinson, Henry Fielding....
Rochester
Wilkinson, Stella .....Duluth
Will, W. W.....Bertha
Willcut, Clarence ...Minneapolis
Williams, A. B.....Worthington
Williams, Clayton.....St. Paul
Williams, Hugh O...Lake Crystal
Williams, L. A.....Slayton
Williams, Robert ...Minneapolis
Williams, R. J.....Pine River
Williams, R. V.....Rushford
Williamson, Carl S.....Rochester
Willius, F. A.....Rochester
Willson, Hugh S.....Minneapolis
Wilmot, H. E.....Litchfield
Wilson, C. E.....Blue Earth
Wilson, Warren .....Northfield
Wilson, W. F.....Lake City
Wilson, W. E.....Northfield
Wiltrout, I. Geo.....Oslo
Winberg, O. K.....Lake Park
Winnica, J. B.....St. Paul
Winter, J. A.....Duluth
Wiseman, R. L.....Pine City
Witham, C. A.....Minneapolis
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wold, K. C.....St. Paul
Wolfe, H. H.....St. Paul
Wolner, Oscar H.....Gilbert
Woltman, H. W.....Rochester
Wood, Douglas F....Minneapolis
Wood, H. G.....St. Paul
Woodard, F. R.....Minneapolis
Woodruff, C. W.....Chatfield
Woodworth, Elizabeth .....
Minneapolis
Woodworth, L. F.....
Le Sueur Center
Woolway, C. J.....Deerwood
Workman, H. M.....Tracy
Workman, W. G.....Tracy
Wray, W. E.....Campbell
Wright, C. B.....Minneapolis
Wright, C. Darcy....Minneapolis
Wright, C. O.....Luverne
Wright, Franklin R..Minneapolis
Wynne, H. M. N.....Minneapolis
Yivisaker, L. S.....St. Paul
Yoakem, Howard Haynes.....
Rochester
Yoerg, O. W.....Minneapolis
Young, T. O.....Duluth
Young, V. A.....Duluth
Zander, C. H.....St. Paul
Zaworske, E. A.....Minneapolis
Zeien, Thos. .....North Branch
Ziegler, Lloyd Hiram..Rochester
Zierold, A. A.....Minneapolis
Zimbeck, R. D.....Maynard
Zimmerman, H. B.....St. Paul
Ziokin, Thomas .....Minneapolis

Honorary Members

Barton, E. R.....Minneapolis
Beard, R. O.....Minneapolis
Chesley, A. J.....Minneapolis
Erdmann, C. A.....Minneapolis
Harrah, J. W.....Minneapolis
Jackson, C. M.....Minneapolis
Murdock, A. J.....Minneapolis

Associate Members

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Hirschfelder, A. D....Minneapolis
Scott, F. H.....Minneapolis
Lyon, E. P.....Minneapolis